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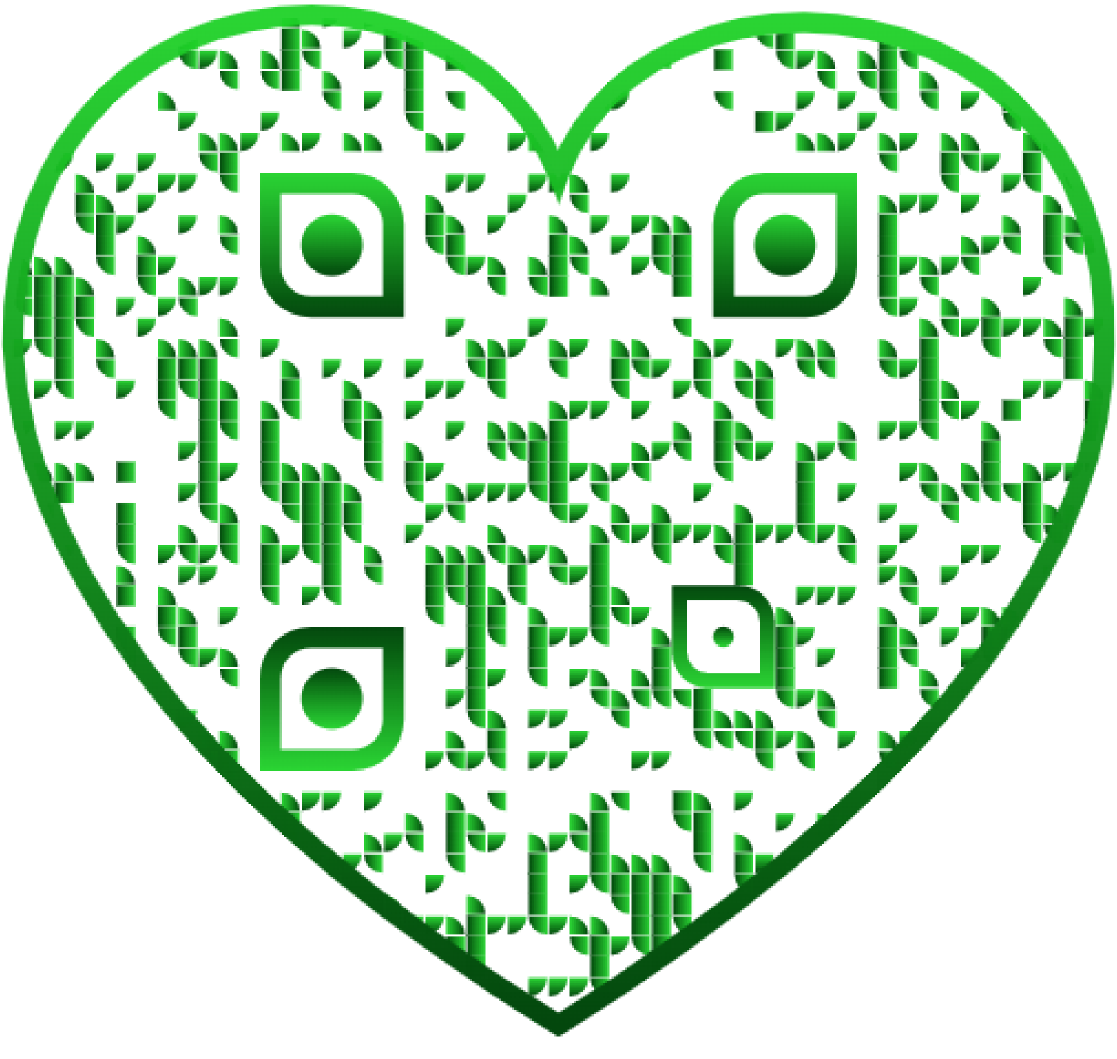

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669/25

A Qatar Airways' A350-1000 approaches the end of the runway at Manchester airport Lee Spencer

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On the cover

A head on view of one of VMFA-232 'Red Devils' F/A-18D Legacy Hornets after taking gas somewhere near the California coastline.

Welcome

Welcome to the August issue of *Aviation News*. Firstly, a very warm welcome to our new readers from *AIR International magazine*. Going forward, *Avnews* will incorporate *AIR International* with features that explore the cutting edge of aviation technology. We commence this by talking to BAE Systems about its next generation Striker II helmet mounted display for the Typhoon. The Striker II is way ahead of its time. It will provide pilots with even more situational awareness, less workload and intuitive data that's easy to breakdown. Uniquely it can provide night vision via its embedded camera without the need for night vision goggles and provide colour symbology at night, a huge advantage in a combat environment. I plan to include more topical features like this to the magazine which I'm sure you'll find interesting.

Probably the most advanced piece of technology of its time, the B-2 Spirit Stealth Bomber made headlines when President Trump ordered strikes on Iran's nuclear facilities on June 21/22. Operation Midnight Hammer saw 14 30,000lb GBU-57 Massive Ordnance Penetrator bombs dropped during a 37-hour mission undetected by the enemy. At the time of writing, it remains unclear if the strike did completely wipe out Iran's nuclear facilities.

Staying on the topic of nuclear, on June 25 Prime Minister Sir Keir Starmer announced the RAF would acquire 12 F-35As to support NATO's Dual-Capable Aircraft nuclear mission. They will be based at RAF Marham with 207 Squadron. This will see the return of nuclear capability to the RAF as the We.177 free-fall nuclear bomb was withdrawn from service in 1998.

The Paris Airshow in June saw plenty of orders, both commercial and military, which we highlight in the news section. One that particularly stood out in my opinion was LOT Polish airlines' first ever Airbus order: 20 A220-100s and two A220-300s. An aircraft that is trending in terms of orders is the Embraer KC-390 – Lithuania announced its desire to procure three of the tactical airlifters at the show and Portugal added a sixth KC-390 to its order.

In features we celebrate a squadron that has been around for a century – the USMC 'Red Devils'. The historic squadron currently flies the F/A-18C/D Legacy Hornet and will eventually transition to the F-35C Lighting II. Plus, we test fly a new piece of kit on the general aviation market, visit a leading company in the aerial firefighting industry and discuss the future of the Airbus Extra Wide Body aircraft. There's also stunning imagery of the final Su-22s in the Polish Air Force… I hope you enjoy!

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See page 40

Joe

Joe Campion, Editor

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August 2025

Main image : **A 509th Bomb Wing B-2 Spirit Stealth Bomber prepares to leave Whiteman AFB in Missouri for Op Midnight Hammer** USAF

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First Qantas XLR Delivered

Dirk Grothe

ON JUNE 30, the first of 28 Airbus A321 XLRs for Qantas, VH-OGA *'Great Ocean Road'*, departed Airbus's assembly line in Hamburg, Germany. OGA was on its delivery flight to Sydney, Australia, flying via Bangkok, Thailand, for a crew rest stop. The aircraft was scheduled to arrive in Sydney on the morning of July 2.

With a distance of 9,600km, flight QF6041, the flight between Hamburg and Bangkok, made history as the longest A321XR flight operated by a commercial airline. The total delivery flight took 42 hours, with 21 hours flying time.

Qantas is set to be the Asia-Pacific launch operator of the single aisle A321XLR. The Qantas XLR fleet has a two-class layout with 20 seats in business class and 177 in the main cabin. The airline will operate the type on domestic flights across Australia, with potential to open up future services to Asia. Qantas personnel have already put in more than 45,000 hours of training in preparation for the XLR, with nearly 1000 team members trained, including pilots, cabin crew, engineers and ground staff.

The Qantas group has 40 A321XLRs on order as part of its fleet modernisation programme. As well as the 28 aircraft due to serve Qantas, 12 will be allocated to low-cost subsidiary, Jetstar. The A321 XLR orders are part of the group's requirement for 128 single-aisle aircraft and 24 A350-1000 widebodies.

Qantas Domestic CEO Markus Svensson commented; "We are proud to be the first A321XLR operator in Asia Pacific and its arrival will mark the beginning of an exciting new chapter for Qantas and a significant step forward in enhancing the experience we offer our customers."

ATR's largest order since 2017

ON JUNE 10, ATR announced its largest airline order since 2017. Taiwanese airline, Uni Air placed a firm order for 19 ATR 72-600s, along with three additional purchase rights.

This is the second batch of ATR 72-600s for the airline after it ordered 10 of the type in 2011. The airline, which is a group company of EVA Air, is expected to take delivery of the aircraft between 2027 and 2032.

The 19 off-the-shelf aircraft are to replace and expand Uni-Air's current fleet of 14 ATR 72-600s. The new aircraft will be fitted with PW127XT engines, an updated cabin design and a new air management system.

Mr. Solomon Lin, chairman of UNI Air, said: "This marks a major step in UNI Air's strategy to enhance domestic air services, playing a vital role in boosting Taiwan's dynamism at local, national and regional levels. With this new order, we are reinforcing our commitment to ensuring a young and modern fleet to serve the domestic market efficiently, offering passengers the highest standards of comfort and reliability."

Uni Air

Three Legends. One Mission!

F-22 Raptor Demo 2025
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F-16
SW
AF 91 395
HL
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Celebrate the legacy of USAF Airpower with this exclusive three-patch collector's set featuring the F-35A, F-22 Raptor, and F-16 Viper Demo Teams. Each patch showcases iconic tail art—from the F-35A's lightning bolt and flag design to the Raptor's 2025 season emblem and the Viper's 50th anniversary YF-16 livery. Own a piece of history and honor the speed, power, and precision of America's premier fighter aircraft.

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Iberia's €6bn investment

IN A presentation in Madrid on June 18, Iberia chairman and CEO Marco Sansavini announced a €6bn investment in the airline's future, of which €4.2bn will be spent on new aircraft.

The growth strategy for the airline, which currently operates 45 long-haul aircraft comprising three Airbus A321XLRs, 20 A330s and 22 A350-900s, will increase this number to 70. The new aircraft will include the delivery of nine A350-900s and five A321XLRs by 2030. The remaining 11 aircraft, likely but unconfirmed as coming from IAG's pool of recently ordered A330-900s, are to be delivered from 2030 onwards. Concurrently, it is looking to update its short-haul fleet with the addition of two A320neos and a pair of A321neos in 2026-2027, with 85% of the fleet expected to be neo-powered by 2028.

Much of the increased capacity from the new aircraft will go to North and Latin America, potentially increasing existing services to the US, Brazil, Dominican Republic, Puerto Rico, Venezuela, Ecuador, Peru and Chile. The airline recently announced new routes to Orlando, Fortaleza and Recife, to which Sansavini added Monterrey, Philadelphia and Toronto – with the last of these marking the first time it has connected to Canada. The Latin American market is a region where Iberia believes it is a leader and expects continued growth of around 5%.

Long-haul cabins will be updated with retrofits, including the A330-200 and A330-300s, "to make them more comfortable, more attractive and offer improved connectivity," prior to the arrival of any new A330-900s. Narrowbody overhead baggage compartments will be increased in size.

Since posting a €351m operating loss in 2012, the airline has climbed to a €1bn operating profit in 2024, creating the 12-15% operating margin needed to make the €6bn investment possible. Sansavini, who took on his current roles in April 2024 and has been with the airline since 2012, also outlined plans to increase employee numbers, expecting to hire an average of 1,000 new employees per year throughout the duration of the 2030 Flight Plan.

Iberia

Forecasted to double

BOEING, AIRBUS and Embraer each released their 20-year commercial market forecasts ahead of the Paris Air Show, projecting strong long-term growth in global air traffic and aircraft demand through to 2044.

Boeing predicts demand for 43,600 deliveries. Passenger traffic is expected to grow by 4.2% annually, more than doubling by 2044. Boeing foresees 33,285 single-aisles, 7,815 widebodies, 1,545 regional jets and 955 freighters. It estimates that 80% of deliveries will replace existing aircraft. Emerging markets will account for over half the global fleet by 2044, up from 40% today.

Airbus's forecast is similar, predicting demand for 43,420 new aircraft, including 34,250 narrowbodies and 9,170 widebodies. It expects passenger traffic to grow by 3.6% annually, driven by rising GDP, urbanisation and an expanding middle class. Around 44% of new deliveries will replace older jets. Airbus identifies domestic India, emerging Asia-China and the Middle East-Asia as key growth flows, with upsizing expected as traffic increases. It also foresees the global fleet doubling to more than 49,000 aircraft, spurring demand for pilots, technicians and support services, including predictive maintenance and connectivity.

Embraer focuses on aircraft up to 150 seats, forecasting 10,500 new deliveries – 8,720 jets and 1,780 turboprops. Global passenger traffic is expected to grow 3.9% annually, with China leading regional growth at 5.7%. Embraer highlights the need for flexible, right-sized fleets to support regional access and development goals.

While differing in scope and emphasis, all three forecasts point to a doubling of fleets and underline aviation's resilience and evolving role in a shifting global economy.

Air Canada's Scottish summer

AIR CANADA conducted the first flight from Montreal Trudeau International Airport to Edinburgh, Scotland on June 26. This service is one of multiple new European routes the Canadian airline has launched this summer. The service will operate three times per week utilising the Boeing 737-Max 8 throughout the summer until September 7. Flight AC936 will arrive at Edinburgh at 0909hrs and leave Edinburgh at 1115hrs on its scheduled days.

Rocky Lo, Air Canada's managing director of international sales, said: "As the only airline connecting these two iconic cities, initial demand for the route has already been strong. We expect interest to grow even further in the coming months, as leisure and business travellers plan their last-minute summer trips."

As mentioned, Air Canada has recently introduced numerous European routes, including Montreal to Porto and Toronto to Prague and Naples. The airline has also resumed its Ottawa-London Heathrow route.

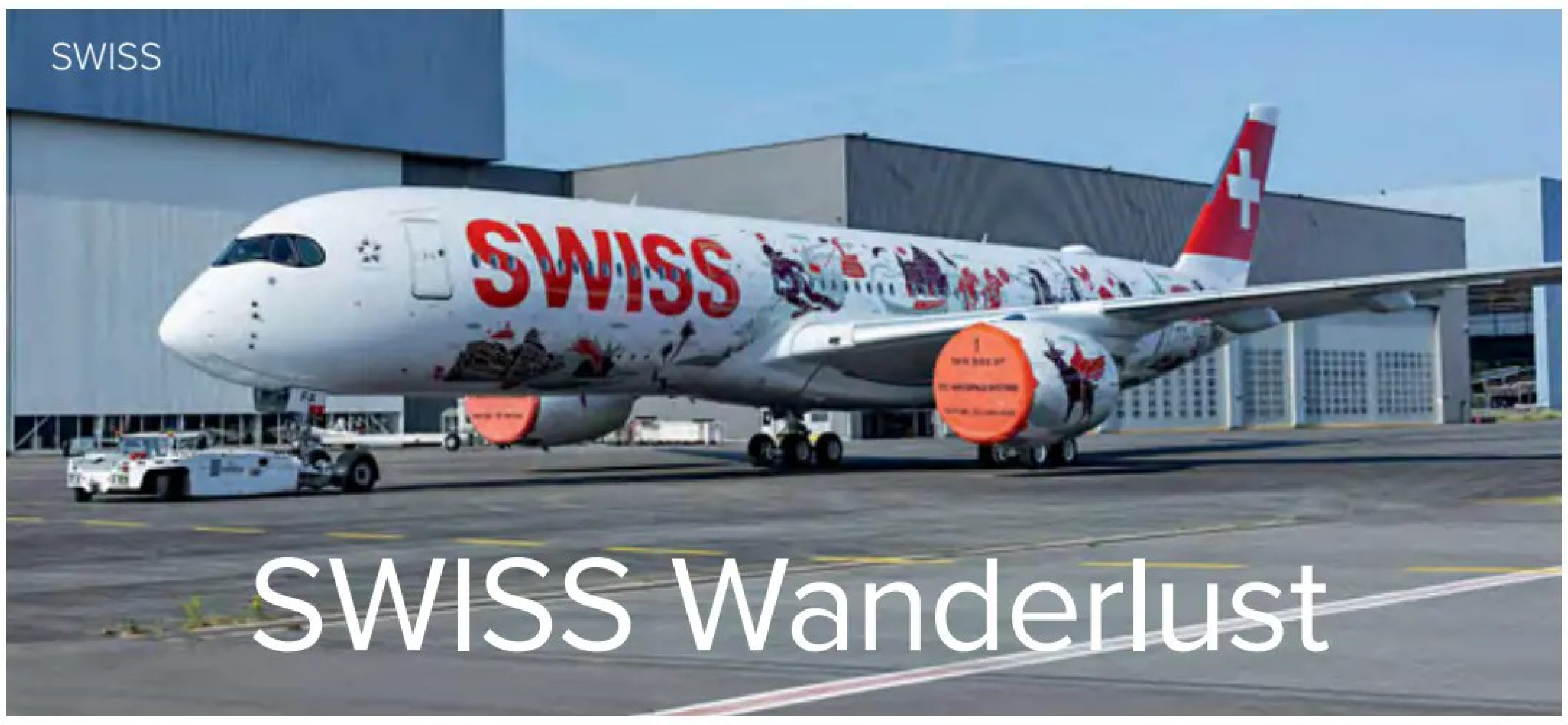
Air Canada

Airbus completes first A350F wings

ON MAY 30, Airbus celebrated the completion of the first set of wings for the new A350 freighter aircraft (A350F) at the company's Broughton site in Chester, UK. The wings have a similar design to the A350 passenger aircraft, so can be built on the same production line.

Airbus is building two A350F test aircraft, which will undergo flight tests throughout 2026 and 2027. The wings will be transported by a Beluga XL to Bremen for final equipping and then sent to Toulouse to be joined to the fuselage of the test aircraft.

Paul Kilmister, head of widebody wings at Airbus Broughton, said, "This is a proud moment for everyone at Broughton. With almost 1,400 orders for the A350, including 63 A350Fs, Broughton will continue to play a critical role in the future of the programme, supporting Airbus's growth in passenger and freight markets."



SWISS

SWISS Wanderlust

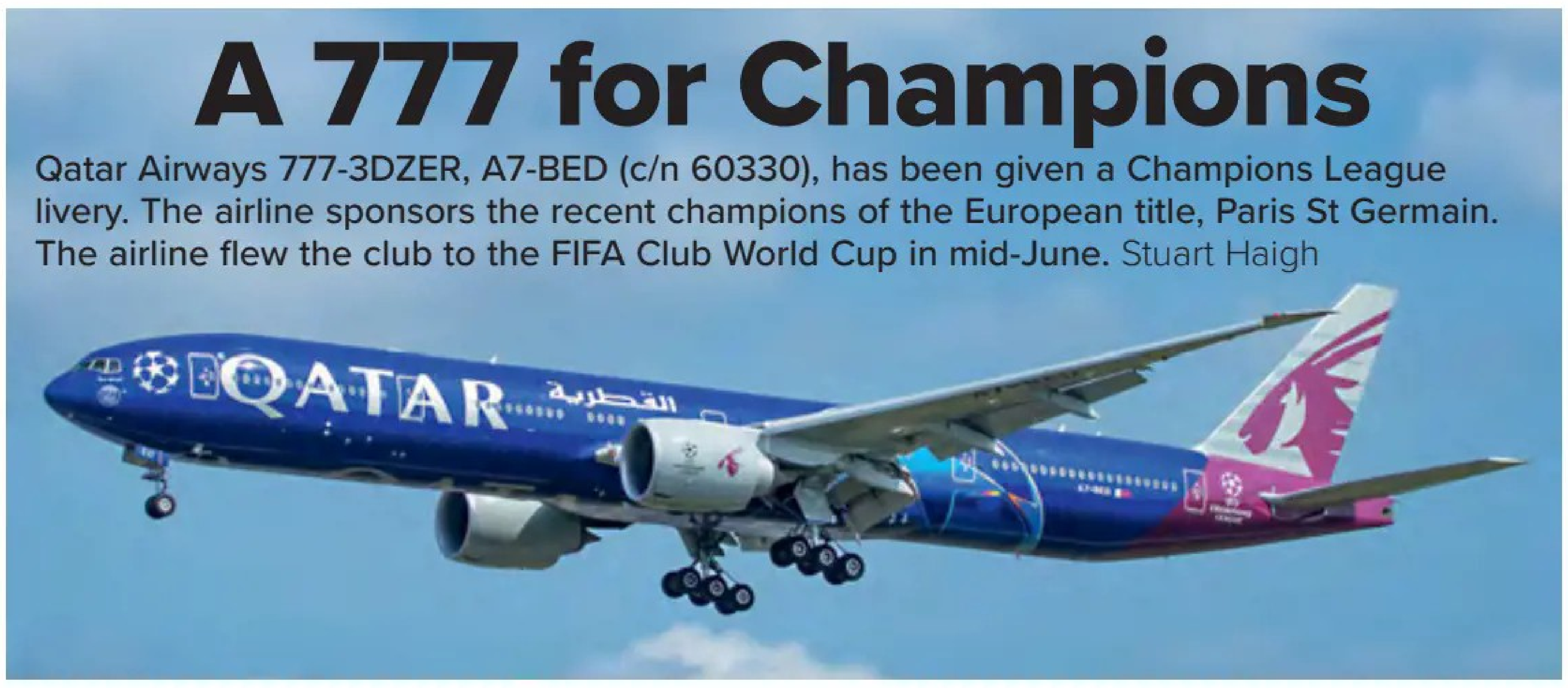
ON JUNE 24, SWISS's first A350-900 broke cover at the Airbus facility in Toulouse. The debut public appearance was extra special due to the A350 having a unique livery dubbed 'SWISS Wanderlust'.

The scheme is not a paint job, but achieved using certified precision-cut films. Never has one of Airbus aircraft had so much film applied. The scheme is also interactive, with visitors to the airline's website able to use augmented reality to explore the livery's illustrations and take part in a treasure hunt to potentially win a flight for two on the A350 in its business class cabin.

The A350 is due to be delivered to Switzerland in late summer. In the meantime, it will be undergoing its first flights and a variety of tests prior to leaving Toulouse.

A 777 for Champions

Qatar Airways 777-3DZER, A7-BED (c/n 60330), has been given a Champions League livery. The airline sponsors the recent champions of the European title, Paris St Germain. The airline flew the club to the FIFA Club World Cup in mid-June. Stuart Haigh



NEWS IN BRIEF

After integrating ITA Airways into its portfolio earlier this year, Lufthansa has continued its rapid integration by making long-haul codeshares available from July 1. The move will mean customers will be able to combine flights from Lufthansa, SWISS, Austrian Airlines and Brussels Airlines into ITA long-haul operations.

Air France-KLM has signed a deal with still-to-launch **Riyadh Air** aimed at improving connectivity for passengers travelling between Riyadh, Paris, Amsterdam and destinations globally. The partnership will focus on strengthening network connectivity and maximising opportunities through Riyadh Air's hub in the Saudi Arabian capital and Air France-KLM's Paris/Charles de Gaulle and Amsterdam/Schiphol hubs.

Norwegian Air Shuttle is to purchase 11 CFM LEAP-1B engines from the powerplant manufacturer to support its growing fleet of modern Boeing 737 MAX aircraft. Deliveries will take place in 2027 and 2028 and will "secure the operational resilience of the airline in a cost-efficient manner." The airline carried 2.1 million passengers in May and now operates six MAX 8s in its 129-strong 737 fleet.

EasyJet has released 22 new routes from 12 UK airports for the upcoming winter season. This includes the first-ever connections from Belfast/International to Rovaniemi in Lapland and Aberdeen to Paris/Charles de Gaulle. Elsewhere, Southampton will tie up with Barcelona, as will Leeds Bradford, while Birmingham will link to Grenoble. New services from London/Gatwick will operate to Toulouse and Vienna, while London/Southend will connect to Berlin and Grenoble. Bristol will offer flights to Munich, Zurich, Verona and Vienna, while in Scotland, Edinburgh will similarly serve Barcelona, Belfast/City and Innsbruck. In the northwest, Liverpool has new services to Vienna, Krakow and Almeira, while Manchester is offering Verona, Strasbourg and Ljubljana.

RYANAIR has agreed a deal with CFM to purchase an additional 30 CFM International LEAP-1B engines to increase its spares bank to 120 powerplants and improve its operational resilience. The airline said the engines have a list price of $500m, and will be delivered over the next two years. The LEAP-1Bs will support the existing fleet of 210 Boeing 737 MAX 8200 aircraft, plus its 737-10s that are due to start arriving in 2027. By the mid-2030s, the airline is predicting a fleet size of 800 CFM-powered aircraft, flying 300 million passengers annually.

Etihad Airways has launched new services, operated with Boeing 787 Dreamliners, to Prague and Warsaw, adding the two Central European capitals to its international network. The first Prague flight landed on June 2, followed a day later by the inaugural arrival in Warsaw. The routes form part of an expansion that will see the addition of 16 destinations to the airline's network in 2025.

United Airlines has become the first US carrier to serve Greenland, launching a twice-weekly rotation from Newark/Liberty to Nuuk on June 14. The 737 MAX 8-operated link has been facilitated by a recent runway extension and other infrastructure work at the Greenland hub. The seasonal link – due to last until September 23 – is only the second occasion on which there have been non-stop flights between the two nations, the first being Air Greenland's short-lived Boeing 757-200 flights from Kangerlussuaq to Baltimore in 2007.

Paris Airshow orders

The 56th edition of Paris airshow took place between June 16 and 22. These are the commercial orders that came out of Le Bourget.

Embraer

Due to the tragic crash of Air India Flight AI171, **Boeing** decided to cancel all new commercial announcements at the show out of respect to those involved. Kelly Ortberg, Group CEO, and Stephanie Pope, Boeing commercial airplanes CEO, did not attend the show to focus on the aftermath of the tragedy.

Embraer

Despite losing out to Airbus on a good-sized order from LOT Polish Airlines (see page 24), Paris Airshow was still a successful event for the Brazilian manufacturer. Embraer dominated day three with announcements at the show.

On June 18, it received a firm order valued at $3.6bn for 60 E175s with purchase rights for 50 additional aircraft from US airline **Skywest, Inc**. Deliveries are scheduled to begin in 2027. Skywest currently has a fleet of 263 and a backlog of 16 aircraft prior to the order, making it the largest E-jet owner and operator in the world.

Chip Childs, president and CEO of SkyWest, said: “As the largest E175 owner and operator worldwide, we’re pleased to continue growing our E175 fleet and enhance our dual-class footprint. This order enables us to advance our long-term fleet strategy and to continue to deliver the premier regional product in the industry.”

Southern African airline Airlink announced its plans to lease 10 Embraer E195-E2s from Azzora, a lease firm based in Florida, US. Airlink has operated Embraer aircraft within its fleet since 2001, and the new aircraft will be delivered from Embraer’s facility later this year through to 2027.

Air Montenegro added a third E195 to its fleet and signed a multi-year contract for Embraer’s pool programme. Amelia, Hunnu Air and Virgin Australia also announced their signing up to the pool programme during the show. Virgin Australia are soon to receive eight E190-E2s.

Moving to the freight variants, Bridges Air cargo will be the launch customer of the new E190F passenger-to-freight (P2F) conversion. The first of two converted jets is expected to commence operations for Bridges in the Q3 this year. The deal is through lessor Regional One.

Regional One itself announced that it would double its pre-existing P2F order of two aircraft, which it placed in 2022, to four. Chief Investment Officer George Mamangakis explained “We’re expanding our freighter fleet with two additional Embraer E-Freighters to better serve the growing demand for efficient, flexible and sustainable cargo solutions. This strategic move reinforces our strong partnership with Embraer and highlights our shared focus on innovation, performance and operational excellence in air freight.”

Embraer

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Airbus

Airbus

Airbus was the only large manufacturer to announce orders on day one of the event. Saudi Arabian aircraft lessor Avilease announced its first ever Airbus order with an initial order for 10 A350F freighters and 30 A320neo aircraft. The agreement also foresees a future increase to 22 A350Fs and 55 A320neos.

The deals on day one kept coming from Saudi Arabia, as new airline Riyadh Air placed a firm order for 25 A350-1000 aircraft, including options for 25 more. Riyadh Air will be the first airline in Saudi Arabia to operate the A350-1000 and will aid the nation's ambition to reach 300 million air passengers annually by 2030.

ANA Holdings finalised an agreement on the opening day, signing a firm order for 24 A321neos and three A321XLRt. The order will see 14 additional A32neos head to All Nippon Airways, as well as 10 A321neos to Peach Aviation. The three A321XLRs are also for Peach, which will be the first Japanese airline to operate the XLR.

Airbus's largest order of the show came on day two. Vietnam's largest private airline, VietJet, signed a memorandum of understanding (MoU) with Airbus for 100 A321neos and potential to add another 50 in the future. Benoît de Saint-Exupéry, Airbus EVP sales of the commercial aircraft business, said: "Our latest agreement comes just weeks after the airline placed an additional order for A330neo widebody aircraft. Together the A321neo and A330neo will be perfect partners for Vietjet to continue to spread its wings, efficiently matching capacity more closely to demand across its network. The airline will also benefit from the high levels of technical commonality that are unique to latest generation Airbus aircraft."

On day three, the A350 dominated the orders. Turkey-based logistics provider MNG Airlines signed a MoU for two A350Fs. EGYPTAIR disclosed a firm order for an additional six A350-900s, taking the airlines total order of A350s to 16. The final announcement was Taiwan's Starlux airline and its order for 10 ten additional A350-1000 aircraft. Starlux already operates an all-Airbus fleet of 28 aircraft, including A350-900s, A330neos and A321neos.The airline now has 30 aircraft on order, including the A350F and A350-1000. CEO Glenn Chai said: "Expanding our international fleet with additional A350-1000s is a significant step toward reinforcing our global presence and enhancing connectivity across key markets."

Prop orders

Leonardo announced the first civilian operator of its C-27J multi-mission aircraft on day two of the show. That operator will be Saudi Arabia's Aloula Aviation, a subsidiary of Aramco. The company signed for two C-27Js and will operate the type for firefighting, medical evacuations, cargo and oil spill response. Delivery of the two aircraft is expected to start from 2027.

Aloula Aviation will be the 20th C-17J operator and take the total number of orders for the type to 95. The two aircraft will have the roll on/roll off modular airborne firefighting system II (MAFFS II), capable of being loaded and offloaded in 90 minutes.

Also on day two, De Havilland Aircraft Canada and Ethiopian Airlines announced a deal for a pair of DHC-6-300Gs, a modern variant of the Twin Otter revealed at this year's Paris Airshow. The Ethiopian 300Gs will be delivered in amphibious configuration. Mesfin Tasew, group CEO of Ethiopian, stated: "We selected the 300-G for its proven performance in difficult environments and its modern enhancements that align with our operational and sustainability goals. The aircraft will be configured with additional equipment for multi-function missions including air ambulance, airport calibration and charter services."

On the first day of the show, De Havilland announced an undisclosed South American customer had purchased a refurbished Dah 8-400. At the time of writing, the customer remains undisclosed.

On day three, manufacturer ATR announced that Texas based operator JSX, a public charter air carrier, is to commence ATR operations in late 2025. JSX announced it will lease two ATR 42-600s, expanding its hop-on service to more private terminals and fixed-base operators across the US. The two ATRs will boast a spacious interior with 30 business class seats, with plans to install Starlink high-speed internet connectivity.

The announcement came with a letter of intent for 15+10 new ATR Highline-equipped aircraft, these being either ATR 42-600s with 30 premium seats or all business-class ATR 72-600s with 30 seats. Alex Wilcox, JSX CEO, commented: "The ATR -600 series will bring over 1,000 new airports into reach for JSX, expanding access to reliable public charter flights across the great US. Many of these airports were, until now, reserved only for those who had the means to fly privately."

JSX

Leonardo

RAF Going Nuclear

"IN AN era of radical uncertainty we can no longer take peace for granted..." said the British Prime Minister, Sir Keir Starmer, announcing on June 25 during the NATO summit that the UK would acquire 12 F-35A Lightning IIs. The 12 A models of the fifth-generation fighter will provide the RAF the capability to join Belgium, Germany, Italy, the Netherlands and Turkey in NATO's dual capable aircraft nuclear mission. The 12 F-35As will be able to release the B62-12 nuclear gravity bomb.

Sir Keir said: "These F-35 dual capable aircraft will herald a new era for our world-leading Royal Air Force and deter hostile threats that threaten the UK and our allies. The UK's commitment to NATO is unquestionable, as is the alliance's contribution to keeping the UK safe and secure, but we must all step up to protect the Euro-Atlantic area for generations to come."

The head of NATO, Mark Rutte, welcomed the plan: "The UK has declared its nuclear deterrent to NATO for many decades, and I strongly welcome today's announcement that the UK will now also join NATO's nuclear mission and procure the F-35A. This is yet another robust British contribution to NATO."

The new F-35As will reintroduce the nuclear role for the RAF for the first time since the end of the Cold War when it retired the WE.177 bomb in 1998. The A models are not additionally ordered aircraft, they are part of the second phase procurement plan of 27 aircraft; the UK decided to procure a combination of the 12 F-35As and 15 F-35Bs to create diversification of the fleet.

The RAF reported that the F-35As will be operated by 207 Squadron, located at RAF Marham, Norfolk; 207 Sqn is the F-35 Operational Conversion Unit (OCU) for the UK. The F-35A will complement the current B models utilised by the unit. The A can carry more fuel than the B variant that the squadron currently operates, meaning the A can stay airborne for longer, extending training time for students. The F-35A also requires fewer maintenance hours, leading to more aircraft availability at the OCU. These factors will improve pilot training and reduce the time taken to get new F-35 pilots to the front line.

Aviation News

USAF budget plan

THE UNITED States is to axe the Boeing E-7 Wedgetail programme, speed up production of the B-21 Raider, order more F-5EX fighters and cut the number of new F-35s in plans for the Fiscal Year (FY) 2026 defence budget, revealed on June 26.

The US Department of Defense also announced that all 162 A-10 close support aircraft will be retired by the end of FY 26, two years earlier than planned.The sixth-generation F-47 programme is to receive $3.5bn in funding following President Donald Trump's March 2025 decision to proceed with Boeing's development.

In a briefing at the Pentagon, the defence department said it is cancelling the E-7 Wedgetail programme "due to significant delays with cost increases from $588m to $724m per aircraft and survivability concerns in a contested environment while investing in alternate solutions including space-based capabilities and adding additional E-2D aircraft".

A senior military official said: "E-7 is perfectly great platform, but we wanted to be able to span the globe. That's a space-based capability. So, if we want to go there, we had to do a large investment in space-based sensing. Which also supports Golden Dome, so it covers homeland defence, it covers Indo-Pacific, which is our priority theatre and services the globe.

Major investments being put forward by the DoD include an additional $10.3bn to speed up the production for the B-21 bomber.The FY 26 budget maintains F-15EX production requesting $3.1bn and 21 aircraft preserving industrial base capabilities while leveraging the platform's superior payload capacity and long-range capabilities, complementary to stealth fighters. F-35 procurement is reduced from 74 to 47 aircraft while maintaining minimum production rates; with increased funding for F-35 Block 4 modernisation and significant investment in spares of about $1bn to address sustainment and readiness challenges.

Together, the F-35 and F-15EX orders total just 45 aircraft in FY 26 – just over half the US Air Force's longstanding goal of 72 new fighters per year to hold down the fighter fleet age and keep capacity steady.

Tyler Hernandez

The US Navy's FA-XX sixth-generation programme will effectively be put on hold to allow for the F-47 work while preventing oversubscription of qualified defence industrial base engineers.

The USAF is also requesting $1.08bn for F-22 modification procurement, which includes an infrared search and track system and stealthy, long-range fuel tanks and pylons, among other modifications. It has dropped plans to retire 32 of the oldest F-22s.

In addition to the A-10s, the USAF also wants to retire 62 F-16Cs and Ds, 21 F-15Es, 13 F-15Cs and Ds, 14 C-130H Hercules cargo airplanes and three EC-130H Compass Call electronic warfare aircraft. **Simon Lee**

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422/25

Finland hosts Exercise Atlantic Trident 25

Filip Modrzejewski

FINLAND HAS staged trilateral exercise Atlantic Trident for the first time, with the Nordic nation hosting aircraft from the UK, France and the United States.

The exercise, which ran from June 16 to 27, aims to further develop Agile Combat Employment (ACE) tactics, techniques and procedures, as well as aircraft cross-servicing and integration among fourth and fifth-generation fighter jets.

Joining the Finnish F/A-18 Hornet fighters were an E-3F AWACS aircraft, Rafale jets, an A400M transport aircraft and an A330 MRTT tanker from France, RAF Typhoons and US F-35A Lightning II, F-15E Strike Eagle jets and KC-135 Stratotanker aerial refuelling aircraft. The exercise also involved NH90 helicopters and ground-based air defence units from the Finnish Army, as well as aircraft from Draken International, providing adversary air services. In total, the exercise involved more than 40 aircraft and approximately 1,000 personnel.

"Finland is a part of NATO's network of air bases," said Col Vesa Mäntylä, exercise director and Deputy Chief of Staff Air Force Command Finland, who continued: "So we must be prepared to receive allied reinforcements. We are at the forefront within NATO when it comes to Agile Combat Employment, but close integration with allies is still relatively new to us."

Brize Break-in

TWO RAF Voyager tankers were damaged by political activists on June 20 in an embarrassing breach of security at RAF Brize Norton, the UK's military air transport hub in Oxfordshire.

Two activists from the group Palestine Action were able to access the air base and ride e-scooters to aircraft hard standings where they sprayed red paint into the engines of a pair of parked Voyager tankers.

The actions drew condemnation from UK Prime Minister Sir Keir Starmer who described the action as "disgraceful" and an "act of vandalism".

The damage, estimated to cost more than £50m to repair, has seen the aircraft removed from frontline duties for an undisclosed period. The incident comes at a time when the RAF Voyager fleet is under pressure supporting operations in the Middle East and the Carrier Strike Group deployment.

These operations do not include refuelling of US and Israeli jets, which the group claimed as justification for their actions. In response, the UK government has taken steps to designate the group a terrorist organisation, and the RAF is perhaps unsurprisingly undertaking an urgent review of security.

GCAP edges closer

THE TRILATERAL Global Combat Air Programme (GCAP) has officially launched Edgewing, a joint venture company that brings together BAE Systems (UK), Leonardo (Italy) and Japan Aircraft Industrial Enhancement Co Ltd as equal partners.

The new company will undertake the design and development of the sixth-generation combat air system under the GCAP and will subcontract the manufacturing and final assembly of the aircraft to BAE Systems, Leonardo, Mitsubishi Heavy Industries and the wider supply chain.

The newly formed entity is described as playing a central role in achieving the programme's ambitious goals – including the in-service date of 2035 – while setting a new benchmark for trilateral industrial partnership across Europe and Asia.

Edgewing will also remain the design authority for the life of the programme, which is expected to be beyond 2070. Its operations and joint teams will work in each of the partner nations with a headquarters in the UK.

Marco Zoff, the first chief executive officer of Edgewing, was formerly the managing director of Leonardo Aircraft Division. He said: "By uniting the strengths of our talented people in UK, Italy and Japan, we are not only delivering the next-generation combat air system – we aim to set a new global standard for partnership, innovation and trust. Together, we will push boundaries, embrace agility, enhance our national supply chains and create a legacy of security and prosperity for our nations and future generations."

Leonardo

GCAP is planned to replace the Eurofighter Typhoon in service with the Royal Air Force and Italian Air Force, and the Mitsubishi F-2 of the Japan Air Self-Defense Force. **Dylan Eklund**

Sweden and Denmark join NATO tanker unit

NATO Allied Air Command

SWEDEN AND Denmark formally joined the Multinational Multi-Role Tanker Transport Unit (MMU) on June 25 during the NATO Summit in The Hague, increasing strategic air mobility across the alliance.

With their accession, the MMU now comprises eight partner nations, enabling the expansion of its Airbus A330 MRTT fleet to 12 aircraft by 2029. A new forward operating base in Denmark is also scheduled, enhancing support for northern NATO members.

Col Ludger Bette, commander of the MMU, said: "The participation of Sweden and Denmark underlines the trust in the MMU project, the willingness to jointly expand capabilities and shows that strategic air mobility in Europe is a combined mission."

Ghost Bat flies in Australian exercise

RAAF/Leading Aircraftman Ryan Howell

EXERCISE CARLSBAD wrapped up at RAAF Base Tindal on June 23 after the successful deployment and operation of Australia's MQ-28A Ghost Bat unmanned aerial combat vehicle (UAV) in the Northern Territory.

The exercise is part of a series of test events held throughout 2025 that will mature and exhibit the capabilities of the UAV. It has successfully demonstrated that the MQ-28A can operate away from Woomera Training Area, South Australia, which to date has been the air operating location.

A developmental aircraft designed and manufactured by Boeing Defence Australia, the MQ-28A is the first military aircraft designed in Australia in more than 50 years.

The project has funded eight initial MQ-28A variants for test and evaluation, the development of mission payloads and the fundamental knowledge, skills and experience in integrated system behaviour and autonomy to operationalise collaborative combat aircraft.

A further three MQ-28A Block 2 aircraft will be delivered, having enhanced design and improved capability, as well as a ground control station.

Danish F-16s in Greenland

PART OF increased Danish Armed Forces presence in the Artic, the Royal Danish Air Force has F-16AMs Fighting Falcons deployed to Greenland. Denmark also has a Navy Frigate and two EH-101s deployed to the country. On June 25, two RDAF F-16s and a Challenger transport aircraft flew two hours from Kangerlussuaq to Pituffik Space Base in Northwest Greenland. As well as to gain experience of operating the F-16 in the Artic, Danish fighter jets commander Niels Andersen was able to greet the base's management. The F-16s were supported by a French multi-role transport tanker (MRTT), which is operating with the Danish fighter aircraft during the deployment.

Danish Defence

NEWS IN BRIEF

THE PROTECTOR RG1 (MQ-9B) officially entered RAF service on June 10. The move follows military certification of the type in May 2025 and a series of test flights by 56 Test and Evaluation Squadron at RAF Waddington. The first Certifiable Ground Control Stations (CGCS) and simulators have also now been delivered and installed at the Lincolnshire base. Deliveries of the remaining six of the medium-altitude, long- endurance UAVs are expected to be completed by the end of the year.

THE **USS Gerald R Ford** (CVN 78) Carrier Strike Group left Naval Station Norfolk, Virginia, on June 24 for a scheduled deployment to the US European Command Area of Responsibility. Embarked on CVN 78 is Carrier Air Wing (CVW) 8.

TWO OF the final three of 50 **AH-64E Apache** Guardians have been delivered to the Army Air Corps in the UK. The pair of attack helicopters, serialled ZM747 and ZM748, were air freighted by C-5M Super Galaxy to RAF Mildenhall, Suffolk, on May 28 before transfer by road to Wattisham Flying Station. The 50th Apache, ZM749, will remain in the US for software testing to enable advanced teaming with uncrewed air systems before being delivered to the UK in 2026.

THE **M-345** trainer aircraft was officially introduced into service on June 12 by Italy's Aeronautica Militare (ITAF). The M-345 will be operational with the 61st Wing at Galatina, replacing the MB-339. The MB-339 has served the ITAF for almost four years and has trained thousands of Italian fighter pilots.

THE ROYAL Thai Air Force has confirmed its selection of the **Saab Gripen E/F** as its new multi-role fighter platform. On June 4, Saab said the decision had been made but no formal contract had yet been signed. Micael Johansson, president/CEO of Saab, said: "We welcome the Royal Thai Air Force's selection of Gripen E/F as its future fighter and look forward to the next steps in this procurement process. Gripen E/F is the best solution to provide Thailand with independent airpower for the future, which will contribute significantly to the nation's safety and security."

Defence at Paris Air Show

As well as commercial aviation, the Paris Air Show is flooded by defence companies and military delegations. This year saw an increase in defence company representation on the previous edition in 2023 – arguably due to the current global situation

FCAS Frustration

Undoubtedly the biggest story at the Paris Air Show was the frustration displayed by Dassault Aviation CEO Eric Trappier on the Franco-German-Spain Fighter Combat Air System (FCAS). He spoke to the American Bloomberg TV network at the show, demanding Dassault lead the programme, and naturally Airbus disagrees.

The spat was even on public display, when you consider where the FCAS mock-up was placed around the side of the Dassault pavilion building, with no marketing, no futuristic weapons or anyone in sight to talk to or discuss the project.

Trappier argued that an arrangement focusing on sharing work, based on the investment by the three governments, wouldn't work, that FCAS would be technologically inferior – undoubtedly a view that the other main partner, Airbus (Germany and Spain) found offensive. He said he wasn't prepared to accept a sub-standard fighter incapable of taking on Russians and Chinese because of financial and other considerations.

Jean-Brice Dumont, head of Air Power at Airbus had a more practical view on the situation: "We all have problems with very detailed work shares, which makes life complicated. We need to aim at something which is simple enough, but I believe it's possible with smart work share and the proper rules of engagement."

Dumont than provided some insight into the issues: "At the moment, we have two competitors, because this is what the two companies [Airbus and Dassault] are now and poised to marry. And that creates a natural ambiguity. We are today married with BAE and Leonardo in the Eurofighter programme, tomorrow with Dassault, and the German's transition from one to the other isn't an easy one when you have to protect our IP, and tomorrow we will have to share everything. I believe that's one of the sources of tensions in this programme. But we need to observe the political will.

"There must be simplifications in the way this programme is shaped. It is shaped a bit – theoretically – because there was no pressing war in 2017 when the programme was initiated. So, yes, we need to simplify it. The rules may have to be changed and some elements of work share changed to make the programme executable."

The three FCAS partner companies are working on several systems of a system – a future manned fighter, collaborative combat aircraft (CCA) and a network that binds it all together by 2040. **Alan Warnes**

Embraer

Moving on to orders placed during this year's show, Embraer and its C-390 Millennium received more orders. The Lithuanian defence ministry announced that it looks to order three C-390 Millennium aircraft to be its next-generation military transport platform. Loreta Maskalioviené, vice-minister of Lithuania National Defence, said: "We have carefully studied the various types of military transport aircraft available on the market, and our assessment has clearly shown that the C-390 Millennium is the most suitable platform to meet our national military operational requirements. Therefore, Lithuania has chosen Embraer Company for further negotiations and expects to finalise the acquisition contract in the coming months."

Embraer also received an order by pre-existing customer Portugal for a sixth KC-390 to increase its current fleet size of five. Embraer and the Portuguese Air Force intend to include ten purchase options in the current contract for potential future acquisitions by European nations or NATO members through the Portuguese State. Joao Bosco da Costa Junior, president/CEO, Embraer Defense and Security, said: "We are extremely honoured by the possibility of expanding our partnership with the Portuguese Air Force and the Portuguese State.

"The acquisition of the sixth KC-390 by the FAP, which has been operating the aircraft since 2023, will be the first additional purchase by an operator, which demonstrates the recognition of the quality and operational results that this aircraft has achieved. The interest in placing additional options on the contract is confirmation that more Western countries may very soon join this group of operators, benefiting all of them in economic synergies throughout the life cycle of the KC-390."

On top of orders for more aircraft, Embraer signed a deal with the Royal Netherlands Air Force for a cutting-edge Aeromedical Evacuation System. The contract comprises one firm order and seven purchase options. The system will allow the RNLAF to provide medevac capabilities with its new fleet of five KC-390s. Embraer currently has 40 Millenniums in the order book with a total of seven countries.

Embraer

Saab

Saab

Moving from transport to special mission aircraft, France announced its intention to procure the GlobalEye Early Warning and Control (AEW&C) aircraft to replace its ageing E-3F Sentry Airborne Warning and Control System (AWACS). A joint declaration of intent was signed between the manufacturer and the Direction générale de l'armement (DGA). The declaration of intent includes France procuring two GlobalEye aircraft, with the option to purchase two additional aircraft. It also included ground equipment, training and support. France is now the third customer of the Saab AEW&C platform, after the United Arab Emirates Air Force and Defence, which operates four, and Sweden, which has three on order.

Bell

On the first day of the airshow, Bell signed its first Bell 412EPX helicopter order from an African nation. A purchase agreement was signed for 12 Subaru Bell 412EPXs for the Tunisian Air Force. The 412EPX will be utilised as a multi-role helicopter and for security missions. This order expands Tunisia's rotary fleet to 39 Bell aircraft, including Bell UH-1s, 205s and OH-58s.

Kaan prototype delayed

Turkish Aerospace general manager Mehmet Demiroğlu announced to the media in Paris that production of the first two Kaan prototypes P1 and P2 has now started, with P3 on the verge of commencing. P1 is expected to fly in the first quarter of 2026 and P2 will follow in the middle of that year, with the third in early 2027.

Initially, P1 was to be flown by the end of this year, but according to Demiroğlu some "supply chain challenges have meant the dates have been pushed back". He went on: "The three prototypes will expedite the flight tests, as we have been set a deadline of introducing the aircraft into service in 2028. As a result, another three Kaans will be built and used in the test programme then delivered to the Turkish Air Force."

Of Indonesia's requirement for 48 Kaans, valued at over $8bn, Demiroğlu insisted it was an order placed on June 11, despite doubts: "The deal will be finalised over the next couple of months when the technical requirements are finalised. We have signed a contract defining the number of aircraft, technology transfers and offset requirements in general. We are now discussing more details and will finalise it in a couple of months." **Alan Warnes**

A joint unmanned adventure

At the beginning of the show, Leonardo and Baykar technologies announced the establishment of a joint venture to develop unmanned technologies. The new company, named LBA Systems, will see Leonardo and Baykar as equal (50%) shareholders. The company will be headquartered in Italy. Roberto Cingolani, CEO of Leonardo, said: "Today, we sign a new strategic international alliance, establishing a key player in the field of unmanned technologies. We firmly believe that technological co-operation is a powerful means to address the unprecedented challenges facing the defence sector. Integrating Leonardo's experience in certification and integrated multi-domain technologies with Baykar's world-class unmanned platforms can truly provide a meaningful boost in seizing opportunities both across Europe and on the global stage."

Selçuk Bayraktar, chairman and chief technology officer of Baykar Technologies, added: "At Baykar, we have always believed that the future of aerospace lies in bold ideas and boundary-breaking innovation. As the world's leading developer and exporter of UAVs, we've turned that belief into reality on the field. This partnership with Leonardo – a company with world-class expertise in C4I systems and complementary capabilities in aviation – is more than a collaboration, it's a catalyst for what's next. Together, we are building a new generation of unmanned systems that are not only intelligent and mission-ready, but designed with ethics and interoperability at their core.

"In a world of growing complexity, this alliance will deliver the AI-driven global security that tomorrow demands. This partnership reflects Baykar's long-term strategy of deepening international cooperation and expanding our role as a global innovator in high-impact, autonomous defence technologies."

Baykar will focus on design and development of advanced unmanned platforms. Leonardo will provide cutting-edge electronic systems and payloads, implement Manned-Unmanned Teaming (MUM-T) and swarming capabilities, and be involved in qualification and certification activities.

N412FW
SUBARU
Bell

de Havilland Canada

Manufacturer de Havilland Aircraft Canada sold a single Twin Otter Classic 300-G to the USAF in a foreign military sale to the Guatemalan Air Force. The Twin Otter serves more than 60 military and government operators around the globe and has built up more than 160m flight hours since its existence.

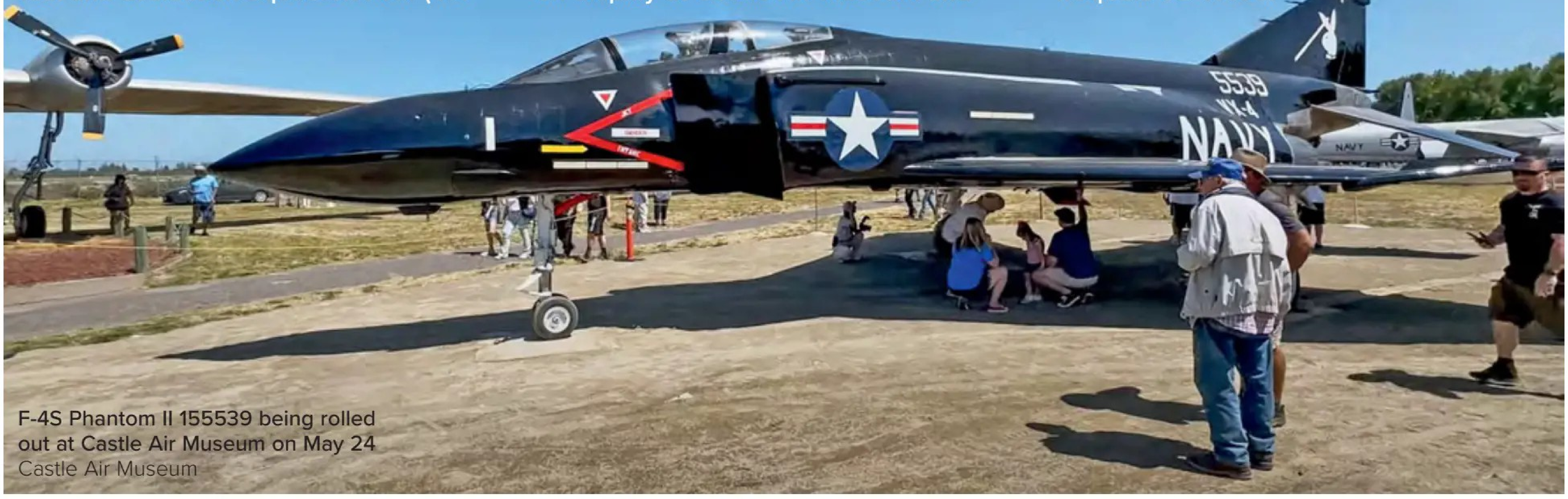
Alan Warnes

Black Bunny completed in California

AFTER NEARLY two years of restoration work, McDonnell Douglas F-4S Phantom II BuNo 155539 *Black Bunny* has been completed and placed on display at Castle Air Museum in Atwater, California.

The eyecatching jet was flown by Air Test and Evaluation Squadron Four (VX-4) during the 1980s at NAS Point Mugu, California, before being retired to the 'boneyard' at Davis-Monthan in Tucson, Arizona. There it remained for some 30 years before being transported to Atwater.

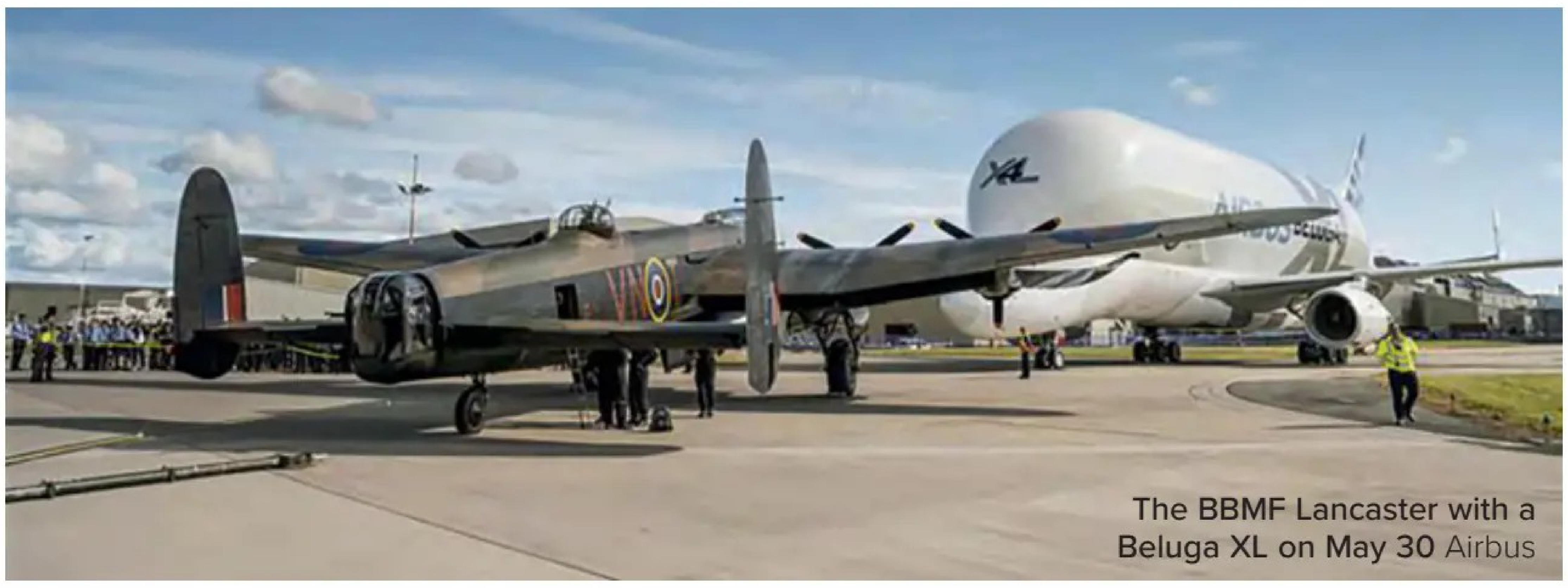
The F-4S is the second Phantom on display at Castle Air Museum and will be maintained by the attraction's skilled volunteers. With *Black Bunny* now complete, the restoration team's attention will turn to other projects, which include their Lockheed F-117 Nighthawk Toxic *Avenger* and Bell UH-1 Iroquois 68-16165.


F-4S Phantom II 155539 being rolled out at Castle Air Museum on May 24 Castle Air Museum

BBMF Avro Lancaster flies 'home'

THE RAF Battle of Britain Memorial Flight's Avro Lancaster PA474 made a memorable return to Hawarden, home to the Broughton factory where it was built, on May 30. The visit marked the 80th anniversary of PA474's first flight from the north Wales airport on May 31, 1945.

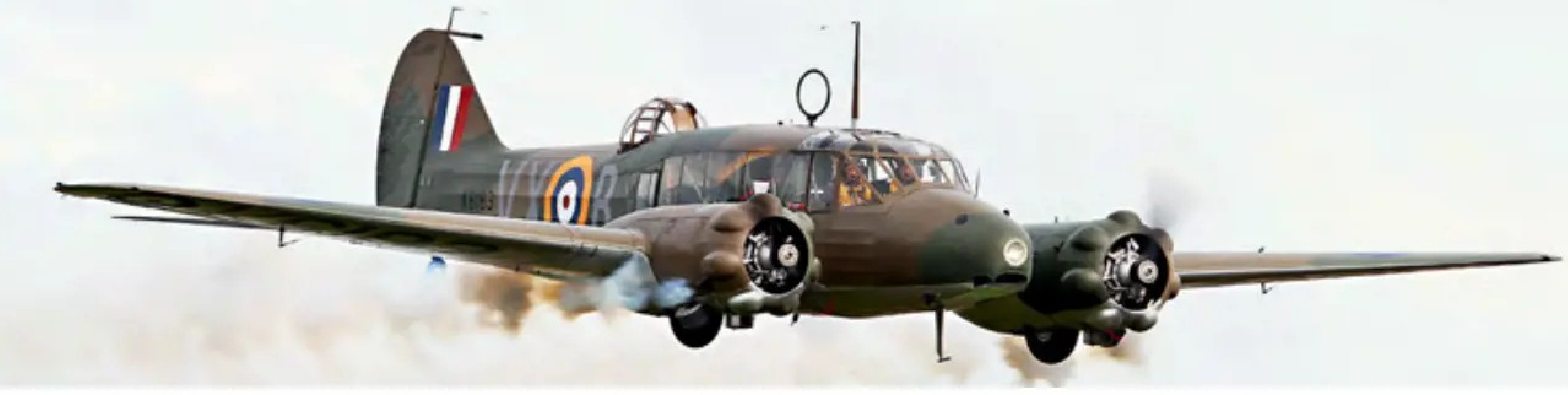
The Lancaster arrived at Hawarden in the company of BBMF Spitfires PR.XIX PM631 and Mk.XVI TE311 – the trio had visited the Midlands Air Festival at Ragley Hall, Warwickshire, earlier that day, with PA474 returning for a flypast on May 31. Hawarden is now home to Airbus's Broughton plant and, on arrival, PA474 was parked next to an Airbus Beluga XL, enabling a memorable past-meets-present photoshoot.


The BBMF Lancaster with a Beluga XL on May 30 Airbus

Among those attending this unique coming together was 99-year-old Ken Shield, who helped build Lancasters, likely including PA474, at the site in 1945. Jeremy Greaves, Airbus head of UK Heritage, described it as "one of the most significant visits to Broughton by an aircraft in its entire history." BBMF OC Sqn Ldr Mark Sugden said: "Our flying season so far has been memorable, and this is one of the highlights of the year in a visit that takes our incredible aircraft back to her birthplace. Thank you to the whole team at Airbus Broughton for the warm welcome."

Czech Avro Anson makes its debut

THE RAF Station Czechoslovakia's Avro Anson I MH120/OO-ANS made its northern hemisphere display debut during the Aviatická Pouť airshow at the joint military/civilian airport at Pardubice, some 60 miles east of Prague, over the weekend of June 7-8. The world's only airworthy Anson I, the aircraft was imported from New Zealand in May 2024 and reassembled by noted warbird exponents FAST Aero at Brasschaat in Belgium, before completing a 19-minute test flight on June 1 with RAF Station Czechoslovakia's founder Richard Santus at the controls. High winds prevented it making a first flight in the previous days and thwarted a debut at the Shuttleworth Collection's Military Air Show on May 31. The Anson was flown to its new base at Podhořany u Ronova, some 12 miles from Pardubice, on June 1, a three-hour 27-minute flight from Brasschaat.


Avro Anson I MH120/OO-ANS makes a low pass in the hands of Richard Santus and co-pilot Andrej Cepko on June 7 KEY-Jamie Ewan

Production Cassio 330 unveiled in Paris

FRENCH COMPANY VoltAero has announced a new production version of its Cassio light transport at the Paris Air Show. While aimed at a range of roles, the Cassio 330 is likely to appeal to business aircraft operators in its new configuration. The aircraft's design has changed from the original twin booms to a more appealing T-tail, but the main difference is use of a pair of electric engines with pusher propellers fitted on either side of the rear fuselage. In addition, there is a thermal engine in the aircraft's interior that keeps the electric batteries fully charged. Accommodating a pilot and up to five passengers, the Cassio 330 is aimed at corporate operators using existing aircraft such as the King Air and Avanti.

Following certification, VoltAero will build the aircraft in a factory in Saint Agnant in the French Charente-Maritime department with a projected production rate of 150 aircraft annually. **Rod Simpson**

VoltAero

Multi-mission King Air launched

Textron Aviation

TEXTRON AVIATION unveiled its new multi-mission Beechcraft King Air demo aircraft at the Paris Airshow. Powered by PT6A-67A engines, the demonstrator is fitted with extended-range (ER) fuel tanks, a factory-installed extended utility nose capable of housing up to 20in EO/IR sensors, factory installed wing hardpoint provisions and a cargo door that supports both air ambulance and freight operations. The aircraft is Night Vision capable allowing 24/7 availability. Showcasing its versatility, the aricraft's interior can feature mission computers and mission displays, VIP seating, mission seating and a medevac stretcher.

India to build Dassault bizjet

IN A major departure from the traditional French manufacturing of its business jets, Dassault Aviation will produce the Falcon 2000LXS in India under a new joint venture with Reliance Aerostructure. Production will take place at a factory in Mihar in northern India and the first example is expected to be completed in 2028. The joint company, Dassault Reliance Aerospace Ltd (DRAL), has been producing nose sections for Dassault over the past seven years and will now take on assembly of wings and fuselages for the twin turbofan Falcon 2000. The Falcon 2000LXS is a major product for Dassault, which delivered 31 examples in 2023. **Rod Simpson**

$1.7Bn Bombardier mystery order

ON JUNE 30, Bombardier announced a firm order for 50 of its Challenger and Global aircraft. The press release did not state the number segmentation between the two types, nor does it reveal which variants of each types have been ordered. What was stated is that the aircraft are to be combined with a first of its kind service agreement. The aircraft and service combined is valued at $1.7bn, with deliveries to commence in 2027.

At the time of writing, the customer has elected to remain anonymous, but apparently they are a first-time Bombardier customer. They also hold 70 new aircraft purchase options. If all purchases within the contract go ahead, it would be valued at more than $4bn.

Éric Martel, president and CEO of Bombardier, said: "This significant order underscores the competitive advantage that Bombardier's full scope of products and services brings to customers throughout the entire aircraft life cycle, from design to delivery, then throughout the in-service journey."

Bombardier

First helicopter-drone partnership for NHV

IN LATE June, NHV announced a first of its kind industry partnership to merge NHV's helicopter operations with long-distance drone service provider, Flylogix.

Flylogix utilises drones to serve several North Sea oil and gas operators by providing services such as monitoring of harmful offshore methane emissions photography to check integrity of ageing oil and gas platforms, and defence surveillance of critical infrastructure, like pipelines. NHV will be unique in the offshore helicopter community by being capable of offering these services, especially with the current rise in demand for them in its industry.

The partnership will have an initial focus in the UK North Sea, serving primarily out of Aberdeen and Norwich with scope to expand further. Jamie John, chief commercial officer of NHV Group, said: "This partnership will deliver a one-stop shop for the energy sector, as our crew transport marries with the innovative solutions offered by drone technology.

"The world, and the UK in particular, is working hard to integrate and modernise its airspace in recognition of the vital role drone flights will play in the future. We are excited to bring this technology to our customers, and the broad scope of possibilities it provides for their evolving needs."

NHV

Leonardo AW139 goes autonomous

HONEYWELL AND Near Earth Autonomy have announced the successful completion of the first autonomous test flight of a Leonardo AW139 helicopter. According to the statement on June 17, the test flight occurred in Phoenix, Arizona, in May. The event marks a major milestone in support of the US Marine Corps Aerial Logistics Connector (ALC) programme.

During the flight, key autopilot modes of the AW139 were controlled directly by Near Earth's on-board autonomy software, without pilot input, showcasing precise flight control and autonomous decision-making.

Bob Buddecke, president, Electronic Solutions, Honeywell Aerospace Technologies, said: "Together with Near Earth Autonomy and Leonardo, we're showing how existing aircraft can be adapted with trusted avionics to support the next generation of defence logistics. Uncrewed aircraft will be vital in keeping service men and women as safe as possible in contested environments, and we are one step closer to realising that vision."

Bell completes Korean order

BELL TEXTRON Inc announced on June 24 that it had delivered all 40 Bell 505 training helicopters to the Republic of Korea Army and Navy.

The order was signed in May 2022 and included the 40 505s, eight simulators and a support programme. Korea joins other government agencies such as the Indonesian Navy, Jamaican Air Force, Japan Coast Guard, Armed Forces of Montenegro, Iraqi Army Aviation Command and the Royal Jordanian Air Force in operating the Bell 505.

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VICTORY IN JAPAN 80 YEARS ON
The cover FlyPast August 2025 features the Commemorative Air Force's famous Boeing B-29 Superfortress 'FiFi' – one of only two to remain airworthy. The Superfortress is often remembered for dropping war-ending atomic bombs on Japan, but in this edition we aim to shed light on some of the type's other roles, both during and after World War Two.

POTTERIES SPITFIRE
In the heart of Stoke-on-Trent where old kilns once smoked there now resides a very different type of craft. Jamie Ewan profiles the Stoke Spitfire.

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Operation Midnight Hammer

The US struck three Iranian nuclear facilities during the night of June 21-22, 2025. The 36-hour mission was carried out by multiple B-2 Spirit stealth bombers, supported by many other aircraft. **Key Aero** reports

▲ A head-on look at a B-2 ready to leave the shed with two GBU-57 MOPs in its bomb bay for Operation Midnight Hammer All images USAF/509th Bomb Wing unless stated

Named 'Midnight Hammer', the operation marked the biggest attack mission ever conducted by the B-2 Spirit, as well as the second longest B-2 mission flown, exceeded only by those in the days following 9/11. And it saw the first operational employment of the GBU-57 Massive Ordnance Penetrator (MOP) 30,000lb bomb.

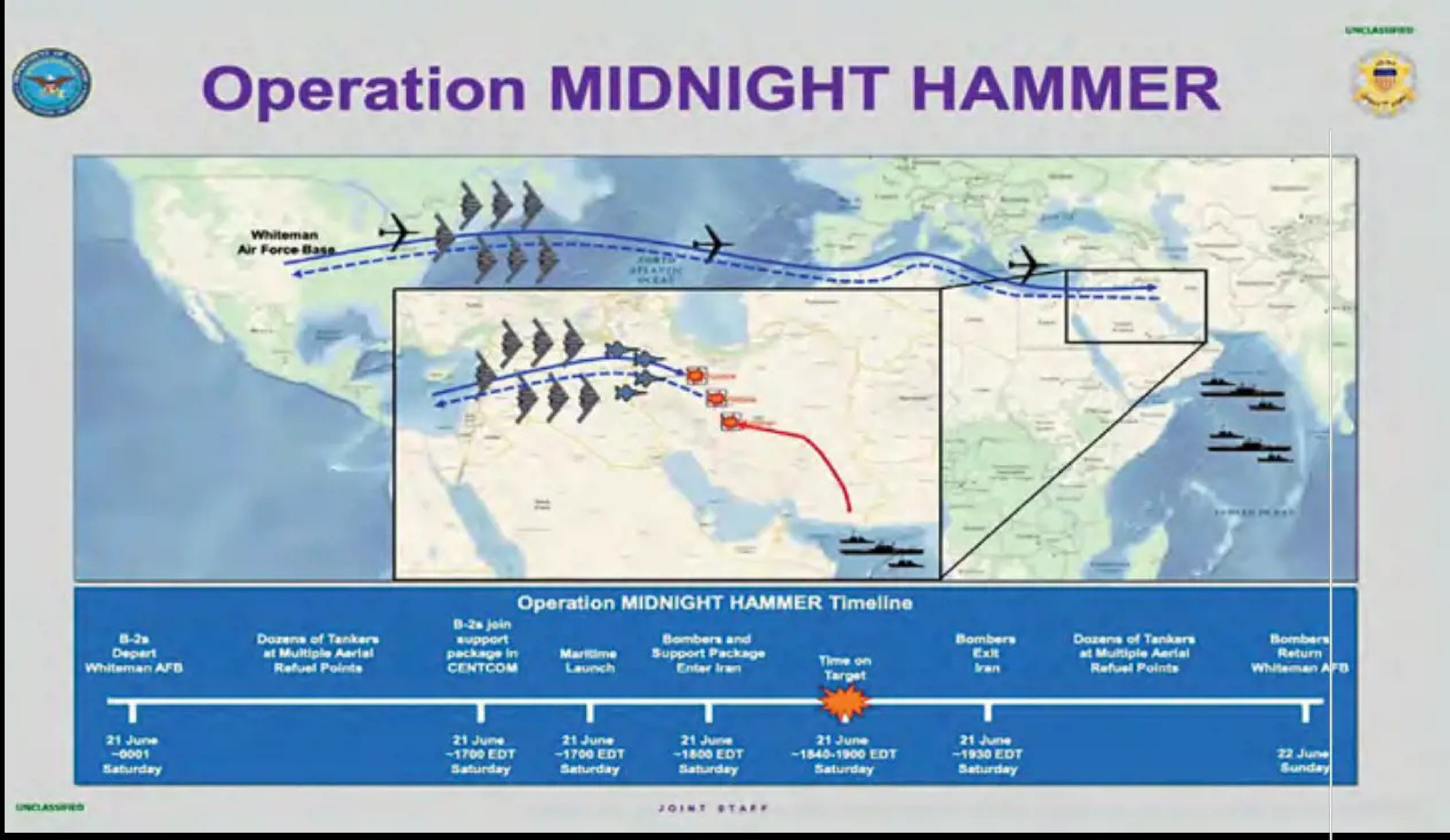
The strike was revealed by US President Donald Trump in a TV address at 10pm US Eastern Daylight Time (EDT), 3am UK time on June 21: "A short time ago the US military carried out massive precision strikes on the three key nuclear facilities in the Iranian regime – Fordow, Natanz and Isfahan."

Mission details

In a press briefing on June 22 at the Pentagon, Pete Hegseth, the defence secretary, said the mission took place "to destroy or severely degrade Iran's nuclear programme". In the same briefing, Gen Dan Caine, chairman of the Joint Chiefs of Staff, revealed more details: "At midnight Friday into Saturday morning, a large B-2 strike package launched from the continental United States." The strike package departed Whiteman Air force Base in Missouri, home of the USAF B-2 bomber fleet.

"As part of a plan to maintain tactical surprise, part of the package proceeded to the west and into the Pacific [to Guam], as a decoy. A deception effort known only to an extremely small number of planners and key leaders here in Washington and in Tampa [where the headquarters of US Central Command (CENTCOM) is located]. The main strike package comprised of seven B-2 Spirit bombers, each with two crew members, proceeded quietly to the east with minimal communications.

▼ Six USAF B-2 Spirits sit on the flightline after supporting Operation Midnight Hammer at Whiteman AFB, Missouri


UNCLASSIFIED
Operation MIDNIGHT HAMMER
Whiteman Air Force Base
Operation MIDNIGHT HAMMER Timeline
B-2s Depart Whiteman AFB
21 June ~0001 Saturday
Dozens of Tankers at Multiple Aerial Refuel Points
B-2s join support package in CENTCOM
21 June ~1700 EDT Saturday
Maritime Launch
21 June ~1700 EDT Saturday
Bombers and Support Package Enter Iran
21 June ~1800 EDT Saturday
Time on Target
21 June ~1840-1900 EDT Saturday
Bombers Exit Iran
21 June ~1930 EDT Saturday
Dozens of Tankers at Multiple Aerial Refuel Points
Bombers Return Whiteman AFB
22 June Sunday
UNCLASSIFIED
JOINT STAFF

▲ A graphic showing details of Operation Midnight Hammer. US Department of Defense

Throughout the 18-hour flight into the target area, the aircraft completed multiple in-flight refuellings. Once over land, the B-2s linked up with escort and support aircraft in a complex, tightly timed manoeuvre requiring exact synchronisation across multiple platforms in a narrow piece of airspace, all done with minimal communications.

"At approximately 5pm EDT last night, and just prior to the strike package entering Iran, a US submarine in the Central Command Area of Responsibility launched more than two dozen Tomahawk land attack cruise missiles against key surface infrastructure targets at Isfahan. As the Operation Midnight Hammer strike package entered Iranian airspace, the US employed several deception tactics including decoys and fourth and fifth-generation fighters. The fighters pushed out in front of the strike package at high altitude and high speed, sweeping in front of the package for enemy fighters and surface-to-air missile threats."

Approaching the targets

The general went onto explain: "As the strike package approached Fordow and Natanz, the US protection package employed high-speed suppression [most likely referring to AGM-88 High-speed Anti-Radiation Missile (HARM) series, employable via USAF F-16Cs, US Navy F/A-18E/F Super Hornets and EA-18G Growlers or USMC F/A-18C/D Hornets] to ensure safe passage of the strike package with fighter assets employing pre-emptive suppressing fires against any potential Iranian surface-to-air threats. We are currently unaware of any shots fired at the US strike package on the way in.

"At approximately 6.40pm EDT, 2.10am Iran time [11.40pm UK time], the lead B-2 dropped two GBU-57 MOP weapons on the first of several aim points at Fordow. As the president stated last night, the remaining bombers then hit their targets as well, with a total of 14 MOPs dropped against two nuclear target areas. All three Iranian nuclear infrastructure targets were struck between 6.40pm and 7.05pm EDT. The Tomahawk missiles were the last to strike at Isfahan to ensure we retain the element of surprise throughout the operation. Following weapons release, the Midnight Hammer strike package exited Iranian airspace and began its return home. We are unaware of any shots fired at the package on the way out.

"Iran's fighters did not fly, and it appears that Iran's surface-to-air missile systems did not see us. Throughout the mission, we retained the element of surprise. In total, US forces employed approximately 75 precision-guided weapons during this operation."

He added: "I know that battle damage is of great interest. Final battle damage will take some time, but initial battle damage assessments indicate that all three sites sustained extremely severe damage and destruction. More than 125 US aircraft participated in this mission, including B-2 stealth bombers, multiple flights of fourth and fifth-generation fighters, dozens of air refuelling tankers [which were located in multiple bases throughout Europe], a guided-missile submarine and a full array of intelligence, surveillance and reconnaissance aircraft, as well as hundreds of maintenance and operational professionals."

Hegseth highlighted how the US had managed to keep the strike covert stating the B-2s were able to get in and out of Iran's nuclear sites "without the world knowing at all".

In response to the US attack, Iranian Foreign Minister Abbas Araghchi said the United States had "opted for a dangerous military operation and aggression against the people of Iran", adding: "In doing so the US administration holds sole and full responsibility for the consequences of its actions including the Islamic Republic of Iran's right to self-defence under the principles of the United charter. In accordance with the UN charter and its provisions allowing a legitimate response in self-defence Iran reserves all options to defend its security interests and people."

On June 23, Iran launched missiles at US bases in both Qatar and Iraq. The base in Qatar was Al Udeid air base, the largest US military installation in the Middle East. The base is home to the USAF 379th Air Expeditionary Wing as well as the RAF's 83 Expeditionary Air Group. Qatar confirmed there were no casualties at the base following the attack and that "air defences thwarted the attack and successfully intercepted the Iranian missiles".

At the time of writing, President Trump announced that Iran and Israel agreed to a ceasefire in the early hours of June 24, which both countries violated only hours later. Trump made it clear he was not happy with either of them, but especially Israel. Later that day, Trump insisted the ceasefire was in effect, posting on his Truth Social account: "Israel is not going to attack Iran. All planes will turn around and head home, while doing a friendly 'Plane Wave' to Iran. Nobody will be hurt, the ceasefire is in effect! Thank you for your attention to this matter!" AN

▼ A US Air Force B-2 Spirit takes off from the Missouri air base to support Operation Midnight Hammer

Losing a LOT to Airbus

Embraer had hoped to sign a deal with LOT Polish Airlines in Paris, but the airline opted for Airbus instead. **Richard Schuurman** has the details

Which one stands out as the most significant order of this year's Paris Air Show, held June 16-22? Is it the one from Vietjet Air for 100 Airbus A321neos plus 50 options – although that's officially still a memorandum of understanding? Or Embraer's deal with SkyWest for 60 more E175s plus 50 purchase rights? Or is it the orders Boeing might have signed but didn't announce at the show out of respect for the victims of the Air India crash a week earlier?

Out of the orders or tentative agreements for 561 commercial aircraft announced in Paris, there's the LOT Polish Airlines one that raised a few eyebrows. After 45 years as an Embraer customer since 1999, the national carrier of Poland opted for Airbus by ordering 20 A220-100s, 20 A220-300s, plus 44 options. The first deliveries start in the summer of 2027 and run through 2030 and are replacing the ageing Embraer E1 fleet, which includes E170s, E175s, E190s, E195s and the three leased E195-E2s that have just entered service.

That LOT prefers the A220 over the Embraer E2 is a blow to the Brazilian airframer. "It is always the decision of the customer, but this has very much been a politically motivated choice", President/CEO Francisco Gomes Neto said.

"Losing a customer after 45 years hurts," confided Arjan Meijer, CEO of Embraer Commercial Aircraft. "I think we did our utmost best and demonstrated to them that we wanted to continue our relationship. But dynamics have come into play on which I can't elaborate. In our view, geopolitical dynamics have played a major role."

Gomes Neto himself flew twice to Poland in the past months to present a compelling offer to LOT Polish and the Polish aerospace industry. Embraer offered the opening of a second final assembly line for the KC-390 multirole transporter and tanker if the Polish Air Force would select the aircraft, something it still has to do. If LOT would buy E2s, Embraer would delegate the production of certain subassemblies to Polish suppliers. There could even be a conversion line for E1 passenger-to-freighters.

But Embraer probably underestimated how the political relationship between France and Poland has become closer over the past months. Poland's prime minister Donald Tusk visited France in May to sign an updated treaty with President Macron about intensifying the co-operation between both countries in various areas, including industry and transportation.

The result of this tie-up was evident in the Airbus media room at the Paris Air Show on the first day when Airbus and LOT announced the A220 order. As well as Airbus Executive Vice-President of Sales Benoit de Saint-Exupéry and LOT CEO Michal Fijol, Airbus Group CEO Guillaume Faury and Commercial Aircraft CEO Christian Scherer were there. So were ministers of France, Poland and Canada (which produces the A220), ambassadors and the entire management team of the airline.

Michal Fijol said: "It is over a year ago when we started to work on the project of re-fleeting and finding the right partner for the new generation fleet of LOT Polish Airlines. The two companies Airbus and LOT, frankly speaking, did not know much about each other. Somehow, our paths never crossed. It was not an easy process. We got two very competitive offers, but I am pleased that you wanted us more. That is the reason why we are here."

Airbus also offered industrial involvement.

POLISH AIRLINES
LOT
POLISH AIRLINES
LOT

▼ A rendering of the Airbus A220 in LOT colours Airbus

The signing of the purchase agreement between the OEM and the airline at the Paris Air Show Richard Schuurman

Airbus put an A220 in a JetBlue paint scheme on static display at the Paris Air Show Richard Schuurman

The OEM already employs 800 staff in Poland and works together with 50 suppliers. In a media statement about the order, LOT said: “Co-operation with Airbus will also affect Poland’s local aviation industry by boosting employment levels, increasing demand for R&D activities and facilitating economic relations with suppliers.” Airbus plans to open a digital hub in Poland over the next 15 years.

Fijol evaded questions about whether this was a political decision. So did Christian Scherer when asked if this order was to compensate Airbus for a lost helicopter order from Poland back in 2016. Both stressed the selection of the A220 has been an aircraft choice. “We truly believe the A220 is the right aircraft for the future of LOT. It serves our growth, and our plan is to grow, to increase the number of aircraft, and the number of destinations, and to serve more passengers. We believe the A220 is an aircraft that offers the best passenger experience, with a modern cabin with more space for passengers and luggage. The A220 also burns less fuel and produces less CO2.”

That’s not the view of Embraer. “We believe the E2 is the best aircraft for LOT from an economic and sustainability point of view. The E2 is 13 per cent more fuel efficient and, unlike the larger competition, perfectly complements LOT’s 186-seat Boeing MAX 8s,” Embraer said in a written statement.

Arjan Meijer added: “I am really convinced that by transitioning to the E2, they would have saved many, many millions for pilot training. The variation we can offer with the 190 and 195 would have complemented their MAX 8s very well. The A220 is bigger than our aircraft, but as such only comes closer to the size of the MAX. With that, you don’t get variation in your fleet mix. Yes, we were surprised by their decision, especially after having worked for so long with them and because of the perceived superiority of our E2.”

It’s not the first time that Airbus’s gain has been Embraer’s loss. In 2021, the Brazilians had high hopes of selling the E2 to Qantas as the replacement for their Boeing 717s. Instead, Qantas selected the A220 alongside the A321XLR. It happened again in late 2023 with Lufthansa: CEO Carsten Spohr had stated that he was happy in doing business with a third OEM, but in the end ordered 40 A220s for City Airlines plus 20 options that recently have been taken up.

Embraer won an important order in Japan with All Nippon Airways, which signed the previously announced order for 15 E190-E2s plus five options in Paris. It also added South African carrier Airlink as a new E2 customer through lessor Azorra. Airlink takes ten E195-E2s that were meant to go to SKS Airways in Malaysia until this deal collapsed in July 2024.

According to some sources, Airbus wanted the LOT deal so much that it gave the Polish a huge discount. It could also be that the E2s didn’t fully convinced the airline. A source familiar with the matter told *Aviation News* that LOT did the lease for three E195-E2s last year because it wanted to see first how they performed.

The LOT deal means the Airbus A220 has some 944 orders. This could surpass 1,000 soon as AirAsia reportedly is to select the type for its fleet, too, although the agreement wasn’t ready for announcement in Paris. Embraer is also hoping to win over more customers for up to 200 E1s and E2s: “Yes, we lost the 40 from LOT, at the same time we see opportunities for new sales campaigns. There definitely is market potential for the E2. It’s never nice to lose a customer, but we have to be realistic that we can’t win them all,” Arjan Meijer said.

A shot of Embraer’s set-up within the static area at the Paris Air Show Richard Schuurman

Operation Rising Lion

Babak Taghvaee reports on Israel's Operation Rising Lion as Israel targets Iran's nuclear facilities in the largest air assault ever unleashed on the regime

▶ The F-16I Sufa strike fighters of the IASF were mostly armed with Delilah-2 cruise missiles, which played a major role in eliminating IRGC generals during the first day of the operation

The Israeli Air and Space Force (IASF), supported by the Mossad intelligence agency, launched a large-scale air campaign aimed at dismantling Iran's military nuclear programme. Codenamed Rising Lion, the operation started on June 13, 2025, and involved more than 200 combat aircraft, multiple KC-707 tankers, airborne early warning and control platforms and a significant fleet of unmanned aerial vehicles (UAVs).

The campaign sought to achieve air superiority by suppressing Iranian integrated air defence systems (IADS) and degrading critical nuclear and military infrastructure. This involved co-ordinated strikes against Iranian early warning radars, surface-to-air missile batteries and tactical air bases.

In retaliation, the Islamic Revolutionary Guard Corps Aerospace Force (IRGC AF) deployed Shahed-136 loitering munitions and ballistic missile salvos, targeting Israeli urban centres and energy facilities.

First wave

The IASF had launched the opening salvo of Rising Lion on June 13 with an unprecedented large-scale strike across Iran. Guided by precise intelligence from the IDF Intelligence Directorate, more than 200 IASF fighters simultaneously struck over 100 strategic targets, including the regime's aerial defence systems, missile launch sites, nuclear facilities and senior military command centres.

Chief of the General Staff of Israel Lt Gen Eyal Zamir underscored the critical nature of the campaign: "We have begun this operation because the time has come; we are at the point of no return. The enemy is intent on destroying us and we must fight for our existence."

Among the most significant achievements of the operation was the elimination of a number of top military commanders of the Iranian regime: Chief of Staff Mohammad Hossein Bagheri, IRGC Commander Hossein Salami, Aerospace Force Commander Amirali Hajizadeh, Quds Force Commander Ismail Qaani and Khatam al-Anbiya Construction Headquarters Commander Gholam-Ali Rashid. Additionally, the IASF destroyed the largest uranium enrichment site in Natanz, underground missile storage tunnels in western Iran and multiple surface-to-surface missile launchers.

Most of the IRGC generals killed in the opening hours of Rising Lion lived in residential areas of Tehran, alongside key nuclear scientists. Supported by JTACs (joint terminal attack controllers) from Mossad on the ground, the IASF precisely targeted their apartments using a range of precision-guided munitions. Buildings in Northern Tehran, where figures such as top military adviser and head of Iran's nuclear programme Ali Shamkhani resided, were struck by Golden Horizon air-launched ballistic missiles deployed from F-15I Ra'am strike fighters and F-15D Baaz multi-role jets.

Meanwhile, targets living in more densely urban areas were engaged with Delilah-2 cruise missiles, primarily launched by F-16I Sufa strike fighters. Despite efforts to minimise civilian casualties, some missiles caused partial building collapses, tragically resulting in the deaths of local people.

Second stage

At dawn on June 13, Operation Rising Lion entered its second phase, the IASF focused on degrading Iran's ballistic missile capabilities by asserting air superiority over key strategic regions including Tehran, Tabriz, Kermanshah and others. The goal was to disrupt the IRGCASF's ability to deploy ballistic missiles against Israel by targeting missile bases and intercepting missile launchers en route to their firing positions.

▼ During the first day of the operation, IASF F-15I Ra'am strike fighters launched Golden Horizon and ballistic missiles at Iran, but their pictures were never released. Once the threats of Iranian air defence sites were totally neutralised, these fighter jets flew within Iranian airspace and dropped precision-guided bombs, as shown in these pictures, armed with Spice 1000 and GBU-39 small-diameter bombs All images Israeli Air Force

◤ Despite being 50 years old, this IASF F-15A Block 17 Baaz multi-role fighter jet of 133 Squadron based in Telnov participated in Operation Rising Lion. It can be seen armed with precision-guided bombs

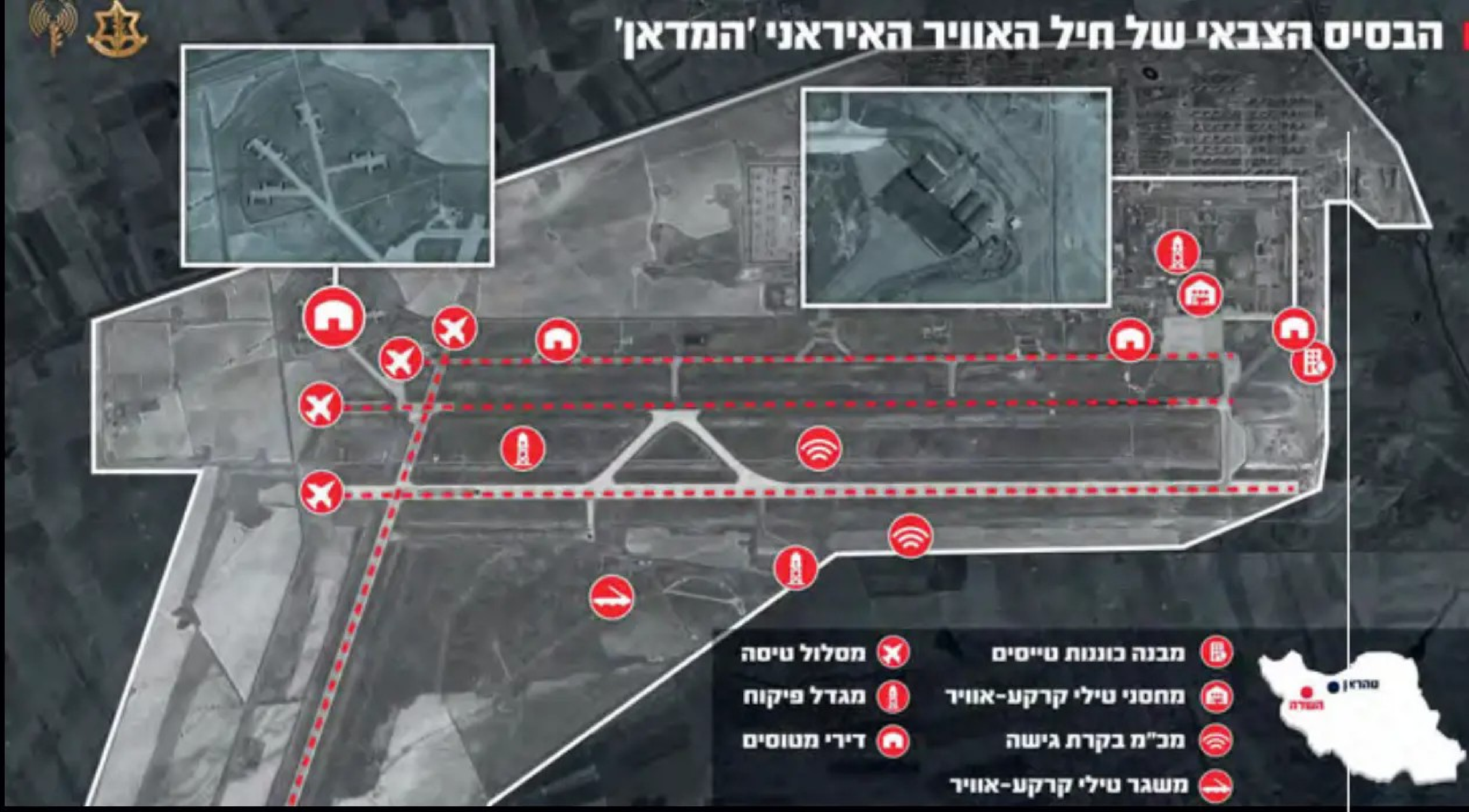
In response, the Iranian Air Force (IRIAF) scrambled various fighter jets across several air bases. In Tehran, a MiG-29B from the 11th Tactical Fighter Squadron (TFS) armed with R-27R and R-73E air-to-air missiles was launched. In Hamedan, an F-4E Phantom II armed with AIM-9J Sidewinders and AIM-7E Sparrows took to the skies, while an F-5E Tiger II armed with AIM-9J Sidewinders was scrambled in Dezful. Despite lacking support from ground-based early warning radar stations – including the Subashi radar near the 3rd Tactical Fighter Base (TFB) Nojeh – these aircraft flew low over urban areas to project an image of defence readiness, to reassure the public, despite the outdated airframes and limited threat potential against advanced IASF fighters.

Recognising the limited combat capability of the Iranian jets, the IASF targeted their bases to neutralise any residual threat and degrade IRIAF operational capacity. The 2nd TFB in Tabriz suffered significant damage, with IASF strikes hitting its drone base, around 20 hardened aircraft shelters and smaller shelters intended for quick reaction forces. This likely inflicted heavy damage on MiG-29B and MiG-29UB fighters of the 22nd TFS, F-5E and F Tiger IIs of the 21st TFS and F-5Es of the 23rd TFS. Air defence assets protecting the base were also targeted to reduce the IRIAF's defensive reach.

Similarly, in Hamedan, the IASF struck hardened shelters, runways, radar systems and an S-200VE air defence battery inside the base, severely degrading its operational readiness. Tehran's 1st TFB Lashgari, located at Mehrabad International Airport, was also hit with strikes against aircraft shelters, refuelling facilities and possibly some of the last remaining MiG-29B and MiG-29UB aircraft of the 11th TFS, including two jets on quick reaction alert.

Prior to these strikes, many of the airworthy aircraft were evacuated to more distant air bases and airports: six F-4E Phantom IIs from the 31st TFS at 3rd TFB were relocated to Bushehr and Bandar Abbas. Similarly, transport aircraft from Mehrabad were sent to Mashhad and other airports farther from Israel's reach. However, on June 15, the IASF struck two of these aircraft on the ground at Mashhad airport – a Boeing 747-131F tanker and a Boeing 747-270C passenger aircraft – further restricting Iranian air mobility.

By effectively disabling airbases, early warning radars and air defence systems across western and central Iran, the IASF established clear air superiority over critical regions. This dominance allowed Israeli fighter jets conducting armoured combat air patrols to detect and destroy IRGCASF ballistic missile launchers and missiles during their movement or at launch sites, significantly hindering missile launches aimed at Israel. Nonetheless, launches still occurred from locations beyond the reach of IASF patrols, highlighting ongoing challenges in fully suppressing Iran's missile threat.



▲ This satellite image released by the IASF shows key facilities in the 3rd TFB Nojeh of the IRIAF hit by the IASF on June 13, including hardened aircraft shelters, quick reaction alert shelters, maintenance hangars, control towers and runways. The IRIAF lost several of its F-4E Phantom IIs and RF-4E Phantom IIs in the attack

Demoralising the Ayatollahs

From the outset of Operation Rising Lion, the IDF and Mossad placed great emphasis on delivering a psychological blow to the Iranian regime. Their goal was to pressure the Ayatollahs not only to surrender their nuclear and missile programmes, but also to abandon their broader ambitions for the destruction of Israel.

A crucial element of this psychological campaign came on the evening of June 15, when the IASF launched two precise airstrikes against the main building of the Islamic Republic of Iran Broadcasting (IRIB), the regime's propaganda arm responsible for spreading anti-Israel rhetoric. The strikes hit the building while it was broadcasting live, glorifying attacks on Israeli civilians in Haifa. Four bombs struck the facility, causing significant damage and inflicting casualties among IRIB staff.

The event was transmitted live, vividly displaying the IASF's air superiority over Tehran and other key cities. Iranian leadership witnessed the power and reach of the Israeli strikes firsthand, no doubt shaking morale. This psychological pressure, combined with the physical destruction, was designed to weaken the resolve of the regime and hasten its capitulation. AN

▼ One of the F-35I Adir stealth fighter jets of the IASF in Nevatim Air Base before the airstrike at Tehran

Dancing with

Joe Campion joins Marine Fighter Attack Squadron (VMFA)-232 'Red Devils' at MCAS Miramar as the unit celebrates its centenary

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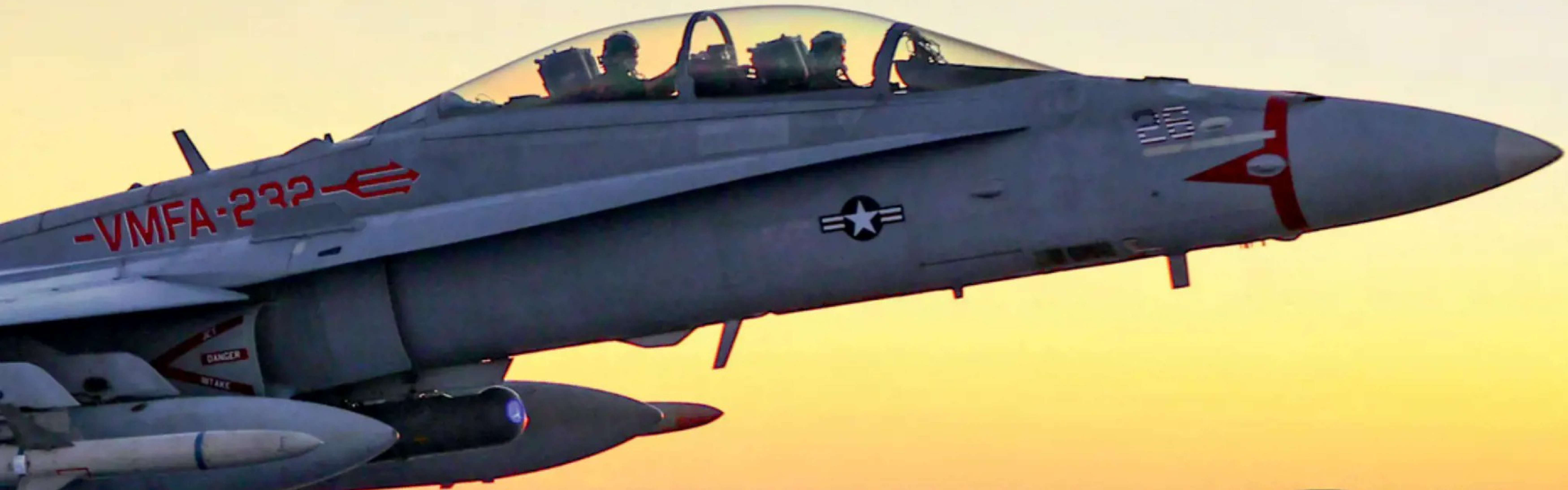
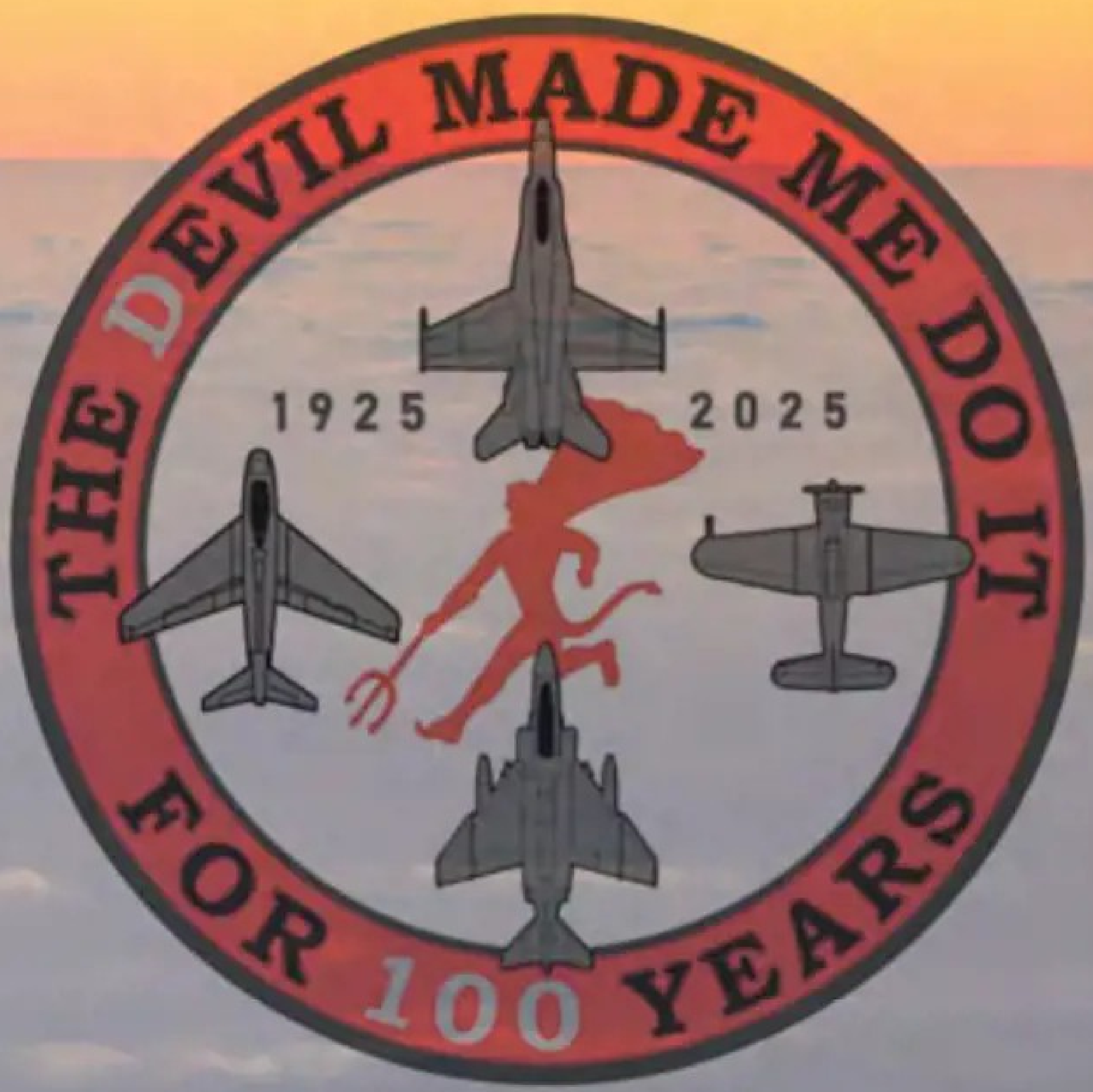
25

"It is an extraordinary honour – and a deeply humbling experience – to lead VMFA-232 as we celebrate our 100th year. All commanders feel the weight of their command, but I also feel the weight of our legacy. Watching Marines work on the flightline and pilots walk to their jets, I am reminded that the 'Red Devils' have been fulfilling their mission for not just 100 years, but also over the skies of Guadalcanal, Vietnam, Iraq and Afghanistan, among others. It is now our turn to uphold this legacy – one that is far greater than any individual – and I am confident that it will continue for another 100 years." Lt Col Suetos, commanding officer VMFA-232 'Red Devils'

"Make it rain, STOIC!" was often to be heard shouted over the radio by forward air controllers during Operation Enduring Freedom (OEF) in Afghanistan, Iraq and Syria. This phrase came after a section of 'Red Devils' F/A-18s from Kandahar, Afghanistan, were out on a close air support mission using the squadron call-sign of 'STOIC'. The jets checked in with a forward air controller who, in describing his unit's situation, called for a 500lb bomb to be dropped close to the Marines' position and inside the munition's documented safety limit. After taking the necessary precautions, the lead pilot released the bomb and it obliterated the Taliban position. The proximity of the bomb blast would result in a rain of debris that fell on the infantry Marines.

-the-Devils





▲ **VMFA-232 has operated the legacy F/A-18C/D Hornet since 1989 and plans to continue operating the jet until 2028** All images Joe Campion unless stated

A battery commander in the 3rd Battalion, 12th Marines, affirmed the quality of VMFA-232's air support by stating: "On many occasions we found ourselves facing a tenacious enemy intent on destroying us. However, we always knew that whatever the situation, we could count on 'STOIC' to arrive and bring some pain [to the enemy]. 'STOIC' was often specifically requested by ground commanders and FACs for air support."

During the deployment at Kandahar, VMFA-232 flew a total of 1,344 sorties, totalling 4,803 flight hours, and delivered 72,393lb of ordnance. The Hornet was allowed to fly lower than other aircraft for strafing runs and expended 20,647 rounds of 20mm ammunition towards enemy forces. This one deployment is an example of what VMFA-232 has bought to the US Marines and collation forces throughout a 100 year history of providing top level aerial support.

The current mission of VMFA-232 is to execute defensive and offensive counter air, air interdiction, strike co-ordination and reconnaissance, armed reconnaissance, maritime strike, suppression of enemy air defense and close air support. The unit fields seven F/A-18Cs and seven F/A-18Ds and comprises 240 personnel, 180 of which are maintenance personnel. The aircrews are a mixture of more than 20 pilots and weapon system operators (WSO).

▲ **F4B-3 with the 'Red Devils' logo** Collection of the National Naval Aviation Museum (NNAM)

The beginning

The 'Red Devils' were originally activated on September 1, 1925, in San Diego, California, as Division 1, Fighting Plane Squadron 3, 2D Aviation Group, flying the Vought VE-7 biplane. Two years later, the squadron embarked aboard the USS *Henderson* to Shanghai, China, for its first combat deployment using the Boeing FB-1, tasked with aerial photography, mapping and reconnaissance. They were redesignated multiple times from VF-3M to VF-10M and eventually became VF-6M. The next aircraft the unit would operate would be the FB-5, which had a significant engine upgrade from the FB-1. This was also the time when the famous 'Red Devils' insignia would appear on the squadron's aircraft.

Throughout the 1930s and into World War Two, the unit would fly many aircraft types and be re-designated multiple times. The aircraft deployed in World War Two started with the Douglas SBD-1 Dauntless Scout Bomber as Marine Scout-Bombing Squadron 232 (VMSB-232). Ten of the squadron's 20 aircraft were lost at Pearl Harbor. They received 12 of the SBD-3 Dauntless as replacements and would inflict damage on the Japanese fleet using these a year later. During a hiatus from the war and returning to San Diego, the unit transitioned to the Grumman TBF-1 Avenger and became a torpedo bombing squadron (VMTB-232) for the rest of the conflict, participating in campaigns such as Guadalcanal, New Georgia, Bougainville, Bismarck Archipelago, Northern Solomons and Okinawa.

In November 1945, the squadron arrived back home to San Diego and was decommissioned. Three years later, in June 1948, it was reactivated as Marine Fighter Squadron 232 (VMF-232), based at NAS Floyd Benner Field, New York. VMF-232 flew the Grumman F6F-5 Hellcat for two years until it started receiving the Chance-Vought F4U-4 Corsair in 1950 amid the Korean War, although it did not see action. In 1952, the squadron relocated again to MCAS Kaneohe Bay in Hawaii.

The jet age

VMF-232 entered the jet age with the Grumman F9F02 Panther in 1953, back at MCAS El Toro. Three years later, the unit returned to Kaneohe Bay, flying the North American FJ-2 and then the swept wing carrier-capable FJ-4 Fury. The next jet from 1962 would be the F8U-2N, later known as the F-8D Crusader, a capable all-weather interceptor with the ability to carry four sidewinder missiles – double the payload of the FJ-4). As a result, the unit became Marine All Weather Fighter Squadron 232 (VMF(AW)-232).

▶ **VMTB-232 TBM-3 over Okinawa in April 1945** Collection of the National Naval Aviation Museum (NNAM)

When operating the Crusader, the squadron moved from Hawaii to MCAS Iwakuni, Japan, in September 1966, focusing on the Vietnam conflict. From December 1966 until September 1967 and operating the E variant of the Crusader from Da Nang Airfield in Vietnam, VMF(AW)-232 flew more than 5000 sorties, over 7000 flight hours and dropped over 6000 tonnes of ordnance on enemy targets.

In September 1967, the 'Red Devils' became the designation we know them as today: Marine Fighter Attack Squadron 232 (VMFA-232). That same month, the unit received the McDonnell F-4J Phantom II. After two years of training on the Phantom II, the unit deployed to Vietnam in March 1969 with the machine. It would fly thousands of combat missions in the F-4J in numerous locations, and complete six Western Pacific (WestPac) deployments aboard aircraft carriers. VMFA-232 flew the Phantom until 1988.

Living legacy

In 1989, still based at MCAS Kaneohe Bay, VMFA-232 received the the F/A-18 Hornet. Six years later it moved to at the time NAS Miramar (now MCAS Miramar) in San Diego, California, which remains its home.

◄ **VMF(AW)-232 F-8E taking off from Da Nang Airfield, Vietnam, 1967** Collection of the National Naval Aviation Museum (NNAM)

With the Hornet, the 'Red Devils' have participated in myriad operations around the world. From the start of Hornet operations up until 2000, the unit formed part of Operation Desert Shield and Desert Storm and performed multiple unit deployment programmes (UDP).

In September 2001, following the 9/11 terror attack on the World Trade Center in New York, the squadron deployed to Guam to protect Andersen Air Force Base, which was a critical air bridge for Operation Noble Eagle. The Hornets of 232 flew for 113 consecutive days and tallied over 262 sorties in direct support. In February 2003, the unit transferred to Ahmed Al Jaber AB in Kuwait and was among the first to conduct sorties in support of Operation Iraqi Freedom (OIF).

In 2004, VMFA-232 commenced the work-up cycle for its first carrier deployment in 46 years, aboard USS *Nimitz* (CVN-68). The 'Red Devils' deployed aboard the carrier between May and November 2005, operating out of the Arabian Gulf and logging 1,145 combat hours over Iraq in support of OIF. The squadron would return to *Nimitz* in 2007, this time in support of both OIF and OEF. Just four months after returning from this mission, the unit was back on the *Nimitz* in April 2008, its last carrier deployment to date. In 2010, the Squadron deployed to Afghanistan for OEF and the legendary 'STOIC' callsign was born.

WT
MARINES
8
31999
20
20 WT
17
17 WT

▲ **VMF-232 FJ-2s in Hawaii in 1956** Collection of the National Naval Aviation Museum (NNAM)

Aviation News sat down with Lt Col Michael 'Dozer' McMahon, who served with the 'Red Devils' for OEF and would later become the unit's CO. He gave us another example of why 'STOIC' was such a trusted callsign: "We were on our second vul or support period working for 8th Marines up in Northern Helmand province with about 15 mins left on station and 3/5 down in Sangin had a patrol out that was ambushed. The squad had a fallen angel and was pinned down in a small ditch in an open field. The 8th Marines' Air Officer saw the request for support from 3/5 come through the chat and sent us down to Sangin to help. Shortly after checking in and getting our targeting pod on the friendlies, we ID'd a set of buildings where the fire was coming from somewhere within. Right around this time, the DASC came up on our frequency and told us that Mirages were inbound and would be below us.

"The problem was the Mirages couldn't talk to us or the 3/5 Air Officer. My wingman was in the D model, so he hit BINGO and had to head back to Kandahar. I started working the 9-line to hit the building with a GBU-12, which was about 150m from the Marines. The rules at the time stated that you had to have two jets on station to back each other on all attacks for

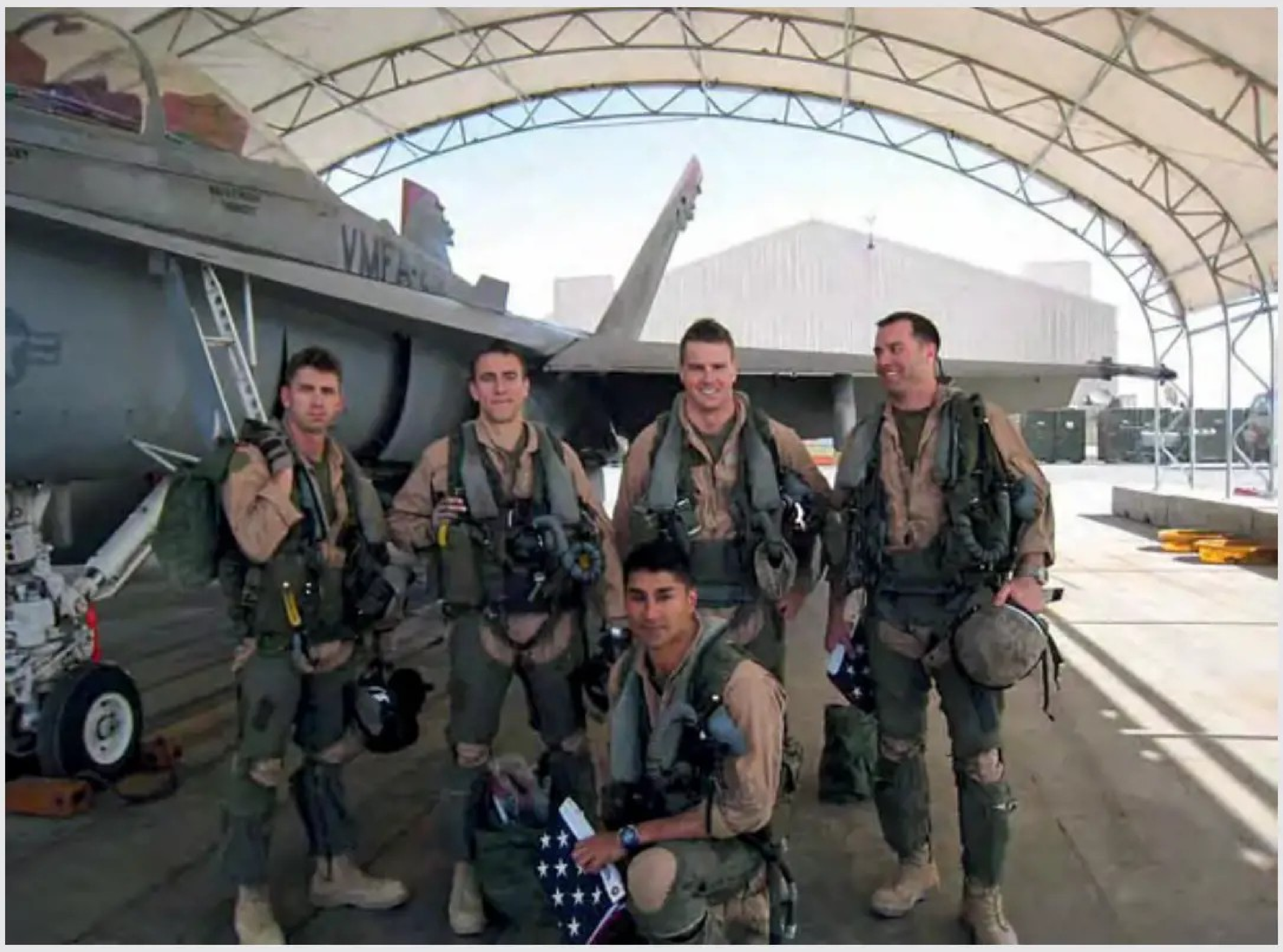
3
MARINES
3836
WT
6
3834

▼ **VMFA-232 F-4J Phantom IIs over Vietnam** US Marine Corps accuracy and collateral damage concerns (mutual support). As I read back the 9-line, my wingman was landing at Kandahar and had been listening to the comms on their back radio, as well as checking my co-ordinates in Link-16. They came up on my Link-16 radio and told me everything looked good, and we were 'mutually supportive' via comms. While this was all happening, I called my CO and Cabbie Sareen (Cabbie was killed in a crash in England on the way back from deployment in 2015). They were over Marjah and started heading toward Sangin. During the attack, I asked the 3/5 AIRO about deconfliction from the Mirages below for the bomb fall line and told him I was very low on fuel. He basically told me: 'Don't worry, just get the enemy to stop firing.' I dropped a GBU-12 and brought it back around for a gun run on the other side of the building, suppressing the enemy fire for the moment. Off the gun run, I climbed to 30,000ft and started my BINGO profile to Kandahar and continued to work a detailed handover with the CO and Cabbie over the Link-16 radio. They hooked my Link-16 track for the target and we did a quick GRG and targeting pod talk all the way through my landing. I pulled off on the taxiway and continued to work it until the CO was on station. Without the Link 16 radio and data, I would not have been able to do the handover or talk to the CO over 80 miles away.

"The CO and Cabbie ended up dropping all their ordnance, successfully supporting the CASEVAC for the fallen angel and remaining Marines. For me, it was a lesson in trust, multi-tasking and the most proficient I have ever felt in employing the Hornet. The Air Officers had the trust and confidence in our squadron, so much so that they would directly deal with other battalions to get our support faster than the DASC could co-ordinate, and they wouldn't hesitate to ask any 'STOIC' callsign to drop danger close to their Marines on the deck."

PRE-PLANNED STRIKE

Lt Col McMahon talks us through one of the only pre-planned strikes for the 'Red Devils' in Afghanistan: "In Support of India Battery 3rd Bn 12th Marines in the vicinity of Kamala Dam, 3/12 was an artillery battery that was doing more of an infantry mission in securing the area near Kajaki. They had been under consistent contact from the enemy for months. We supported them numerous times through the deployment for on-call CAS. The mission took months to get approved due to the rules of engagement at the time. The CO made the call that it would be all junior officers for the mission. We went in two waves, five Hornets on the first and four on the second. The targets were IED factories, weapons caches and Taliban hideouts. Between the two waves, we dropped more than 20 GBU-38s on over 10 different targets. In the five-ship wave, our first pass was nine bombs simultaneously. Things quieted down for a good while after that."



▲ (From l to r) 'Kraut' Kriegbaum, 'Dozer' McMahon, 'Postal' Knipe, 'Foam' Zetts, and 'Cabbie' Sareen (kneeling). Not pictured is 'Eeyore' Nannen, who was killed in a crash in 2014. LtCol McMahon

In autumn 2025, the squadron expects to deploy on another UDP at MCAS Iwakuni in Japan as part of the Marines UDP programme

VMFA-232
DEVILS

◤ A F/A-18A Hornet assigned to the 'Red Devils' lands aboard the USS *Nimitz* US NAVY

◥ The 'STOIC' callsign used by the 'Red Devils' on multiple deployments, became a source of relief and reassurance for those on the ground in need of air support

VMFA-232 returned to MCAS Miramar in November 2010. Five years later, the squadron was transferred to Shaikh Isa Air Base in Bahrain. Using the 'STOIC' callsign, provided CAS in Iraq and Syria, logging 775 sorties over 4,900 hours and deploying more than 392,500lb of ordnance.

Since Bahrain, the 'Red Devils' has deployed multiple times as part of the UDP to Iwakuni, Japan. During these UDP deployments, the squadron has worked alongside joint and coalition forces and operated out of numerous locations, including Kadena Air Base in Okinawa, Andersen Air Force Base in Guam, Nyutabaru Air Base in Japan, Osan Air Base in South Korea and the islands of Tinian and Saipan. Additionally, it has executed numerous detachments to support major exercises, including Cope North (Guam), Red Flag (Nellis), Arctic Defender (Alaska) and Rim of the Pacific (Hawaii).

Looking to the future

The legacy F/A-18C/D Hornets being operated by the squadron today have received many upgrades since the unit started operating the type. The aircraft are fitted with the APG 79v4 active electronically scanned array radar, which was first introduced to the unit's fleet in 2022. The radar brings vast improvements on detection range, air multi-targeting capability, ship/ground moving target detection/tracking and electronic jamming protection when compared to mechanically scanned radars. It allows the F-18s to provide better support to the F-35/Joint partners in an air-to-air combat, as well as anti-maritime fight.

Another upgrade – the Embedded National Tactical Receiver (ENTR) – provides beyond-line-of-site targeting and threat data to the Hornet passively and without having to be in a Link-16 network anywhere

▼ A pilot begins the pre-flight inspection of his F/A-18 Hornet in Southwest Asia before departing on a strike mission, May 28, 2015 USMC/Cpl John C Baker

VMFA-232 is part of MAG-11 of the 3rd MAW, home stationed at MCAS Miramar, San Diego. The unit shares the airfield with VMFA-323, VMFAT-502, and VMFA-314

in the world. The ENTR-equipped Hornets can receive this data without having to broadcast any electronic emissions.

The legacy fleet has also received continual mission computer software upgrades. The pilots and WSOs utilise the joint helmet-mounted cueing system (JHMCS) alongside the jets' LITENING targeting pod for increased situational awareness and precision in the battlefield.

In 2025, the squadron took part in Red Flag 25-2 in March. According to one of the unit's pilots: "Red Flag 25-2 was a great opportunity for aircrew to hone their skills in a high-end large force exercise with joint and international partners." During the exercise, the 'Red Devils' routinely assumed mission commander and team lead roles, allowing seasoned aircrews to maintain proficiency in these roles and providing upgrade events for younger aircrews. The squadron flew numerous mission sets, including OCA, DCA, SEAD, Strike and Dynamic Targeting (DT). Each exercise day averaged eight sorties and approximately 16 flight hours. The pilot noted "One significant takeaway for the squadron was the performance of the new APG-79v4 radar, which has not only increased the lethality and survivability of the 'Red Devils' in the air-to-air arena, but also enabled the F/A-18C/D to provide increased situational awareness to other aircraft, improving overall package effectiveness against a robust air-to-air picture."

In terms of weaponry, in the OCA/DCA role the squadron often simulates load outs of AIM-120s and AIM-9Xs. In the SEAD role, the load comprises AIM-120s, AIM-9xs and AGM-88s. For dedicated air-to-ground missions, the standard loadout includes AIM-120s, AIM-9Xs and 2-4 precision guided munitions including JDAM, Laser JDAM, Paveway II, Maverick, JSOW and JASSM.

In Autumn 2025, the squadron expects to deploy for another UDP at MCAS Iwakuni. Prior to that, it will

The squadron often carries AGM-88 HARM missiles for the SEAD mission

Two 'Red Devils' take on fuel from a KC-130J tanker from VMGR-352 'Raiders' KC-130J tanker off the coast of San Diego during Red Flag 25-2

"It is now our turn to uphold this legacy – one that is far greater than any individual" *Lt Col Suetos, Commanding Officer VMFA-232 'Red Devils'*

After taking fuel, a 'Red Devils' F/A-18D breaks away from the KC-130J tanker

continue to support service level exercises, including the Marine Corps Weapons and Tactics Instructor Course (WTI), as well as joint exercises such as Joint Exercise SOCAL in the summer.

When asked why the Hornet is still a valuable air asset in the modern battlefield, Lt Col McMahon replied "The Hornet is still the only USMC asset with anti-maritime weapons, as well as the longest-range air-to-surface munitions. With the JASSM and SLAM-ER upgrades we can now remain more survivable and contribute more effectively when teamed with fifth-generation and fourth-generation+ partners. The radar gives us the ability to employ our air-to-air weapons further and be able to detect threats at greater range. Combined with our higher loadouts and when teamed with the F-35, our lethality is more than viable till the end of the decade."

The next machine

According to USMC AVPLAN 2025, named Project Eagle, the unit is currently scheduled to operate the legacy Hornet until 2028, while starting to receive the Lockheed Martin F-35C Lightning II, the carrier-capable variant of the fifth-generation fighter, although details are subject to change.

Regarding the transition to a fully operational squadron with the F-35C, Aviation News was told: "Although subject to change, the squadron expects to reach initial operational capability with the F-35C in 2029 and full operational capability with 12 F-35Cs in 2031.As of today, future F-35C pilots with VFM-232 will be trained the same way as current Marine C pilots at VFA-125 at NAS Lemoore.

Throughout its 100 years, the 'Red Devils' has been there when called upon. With the latest upgrades and top-level training, it will continue to do so with the legacy Hornet for a few more years. After that, it will continue its duty as a lethal and reliable unit with the most modern hardware and tactics. A VMFA-232 F-35C will be a sight that no enemy wants to see. No one wants to dance with the devil.

Cpl Austin Musselwhite, a fixed-wing aircraft mechanic with the 'Red Devils', sends off an F/A-18D Hornet at Andersen Air Force Base, Guam USMC/Lance Cpl David Getz

Racing to the front

French manufacturer Aura Aero is debuting its certified Integral R model, which is generating a great deal of interest. ***Filip Modrzejewski*** and ***Jakub Śliwiński*** take this aircraft for a test flight

integral R
F-WIAR

The authors had this aircraft on their radar for some time. The talk between many was about improving their fleets for aerobatics and UPRT (upset prevention and recovery training) with the new Integral R, so it's clearly already generating a lot of interest. The aircraft makes a strong impression both in terms of design and aesthetics, and after an aerobatic flight in the aircraft, its potential really came to life.

Integral R in Poland

At the start of 2025, the aircraft received full EASA certification and the first production unit was delivered in May this year to a private owner in France. At the same time, the aircraft began gaining more and more popularity, and thanks to a partnership with JB Investments & Aeroclub (the official dealer for Poland), the Integral R made its way to Poland at the end of May. This was not a coincidence, but a dedicated showcase event featuring multiple flights and the opportunity to get to know the aircraft up close in Konstancin-Jeziorna, near Warsaw.

On site, the authors met with Bastien Sclafer and Romain Cœur – the Sales Director and Demonstration Pilot, respectively. The Integral R, painted in a unique light grey livery with the registration F-WIAR, was ready for action. F-WIAR is a prototype used for certification and various flight tests. The aircraft has already clocked several hundred flight hours, yet it still looks brand new. The fuselage is sleek and aerodynamic, and on the wings, fuselage, and tailplane, there's a small painted triangle pattern. "Painting just that pattern took about three weeks. For our clients, we offer a few standard paint schemes, but we can also prepare custom designs," explained Bastien.

Versions R, S, and E

WAIR is the certified R model (R for racing), featuring a tailwheel configuration as befits a true aerobatic aircraft. Aura Aero understands tailwheel aircraft come with certain limitations and are slightly more demanding for the pilot. That's why a second version, the S model, is also in the process of certification. It features a slightly less powerful engine (180hp vs 210hp), but comes with a nosewheel, aiming to eventually achieve full IFR certification. This makes it an ideal solution for advanced training, while still being capable of performing basic aerobatic manoeuvres. The company expects the aircraft to be available by the end of this year.

The third variant is the electric E version and the company are looking to have the model available by the start of 2026. The aircraft structure is very similar to the S model, but its propulsion system is fully electric. The current maximum flight time is 45 minutes, with a future goal of reaching 90 minutes. "This aircraft is our answer to environmental concerns, but also the essence of innovation. We've already completed the first flights, including aerobatic ones, and it behaves very similarly to the combustion version – outperforming it in some respects, such as the climb rate," said Romain.

▲ The Integral R visited Poland at the end of May, stopping by JB Aviation & Aeroclub headquarters. The Vistula River always makes for a perfect backdrop during photo flights. (Note the triangles on the extensions.)

◀ The Integral R (R is for racing) is a new kid on the block of general aviation, with an aerobatic load limit rated at +/- 7.5G All images Filip Modrzejewski

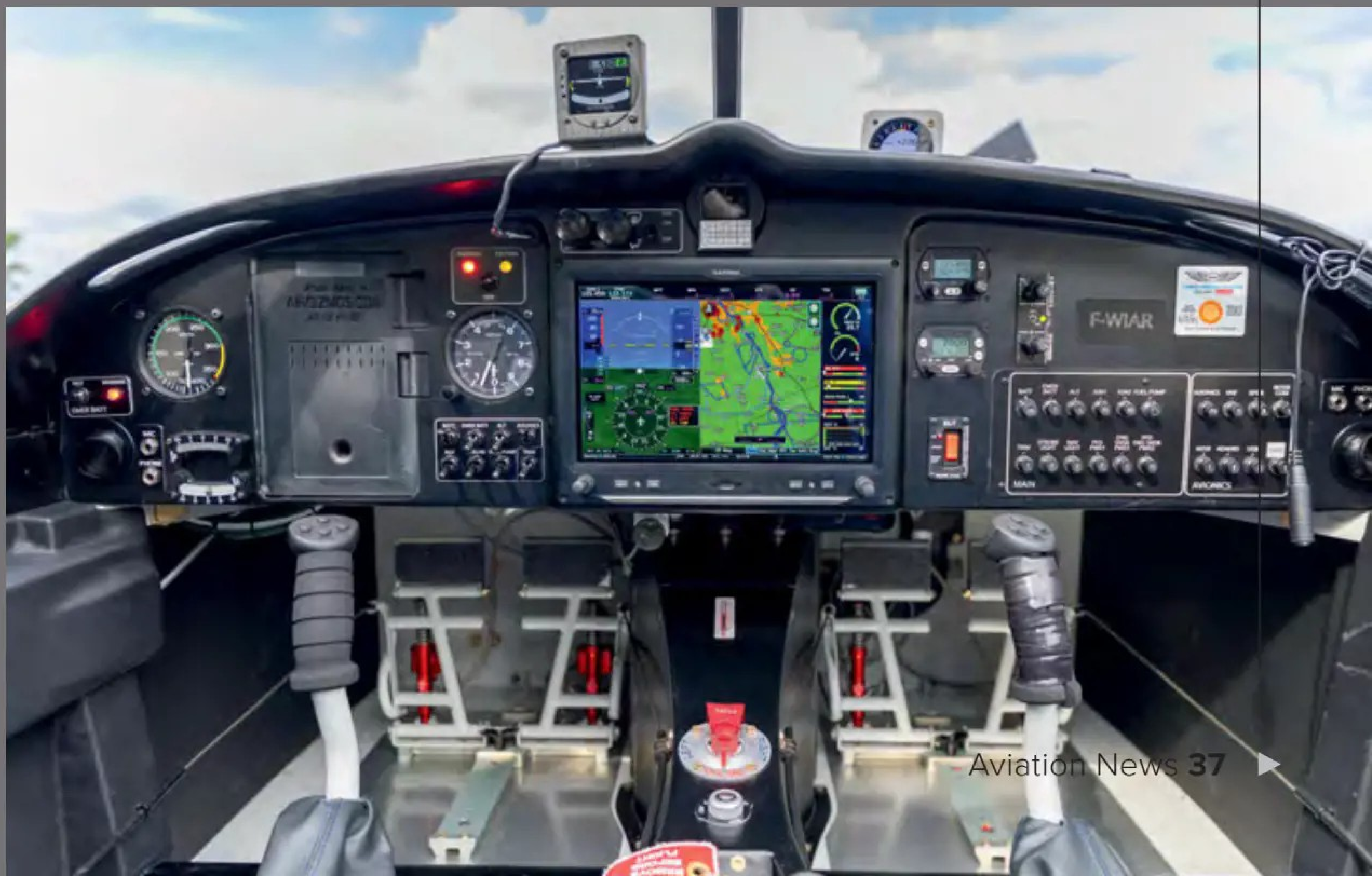
Wood and carbon

The designers of the Integral R opted for a classic and robust construction, primarily based on wood, reinforced with carbon fibre, all bonded with a special adhesive to enhance durability. Both the fuselage and wings are mainly wooden, while the control surfaces are predominantly made of carbon fibre. Notably, the ailerons lack the usual counterweights underneath to improve left/right stick responsiveness, yet full deflection control remains completely effortless.

As expected of a tailwheel aerobatic aircraft, the Integral R has no flaps. The tailwheel is additionally reinforced and built with a sturdy steel structure to ensure safe operation from grass airfields. An interesting design detail is the fused construction of the front canopy section with the engine cowling – this prevents it from tearing off and ensures the aerodynamic flow around the aircraft remains uninterrupted. It is one of several thoughtful improvements over other aircraft in its category.

What about maintenance for such a machine? Bastien told us: "It's no different than any other aircraft. It can be maintained by properly certified Part-145 organisations familiar with working on wood and composite structures. The engine is a standard Lycoming, and the avionics are from Garmin and Trig – both widely used brands. Additionally, we have a team of mechanics who can quickly reach any location in Europe in case of urgent issues."

▼ The cockpit is spacious, and the side-by-side seating layout is ideal for flight training. The Garmin G3X serves as the main avionics' suite. In front of the pilot is space for either an iPad or an aerobatic sequence card

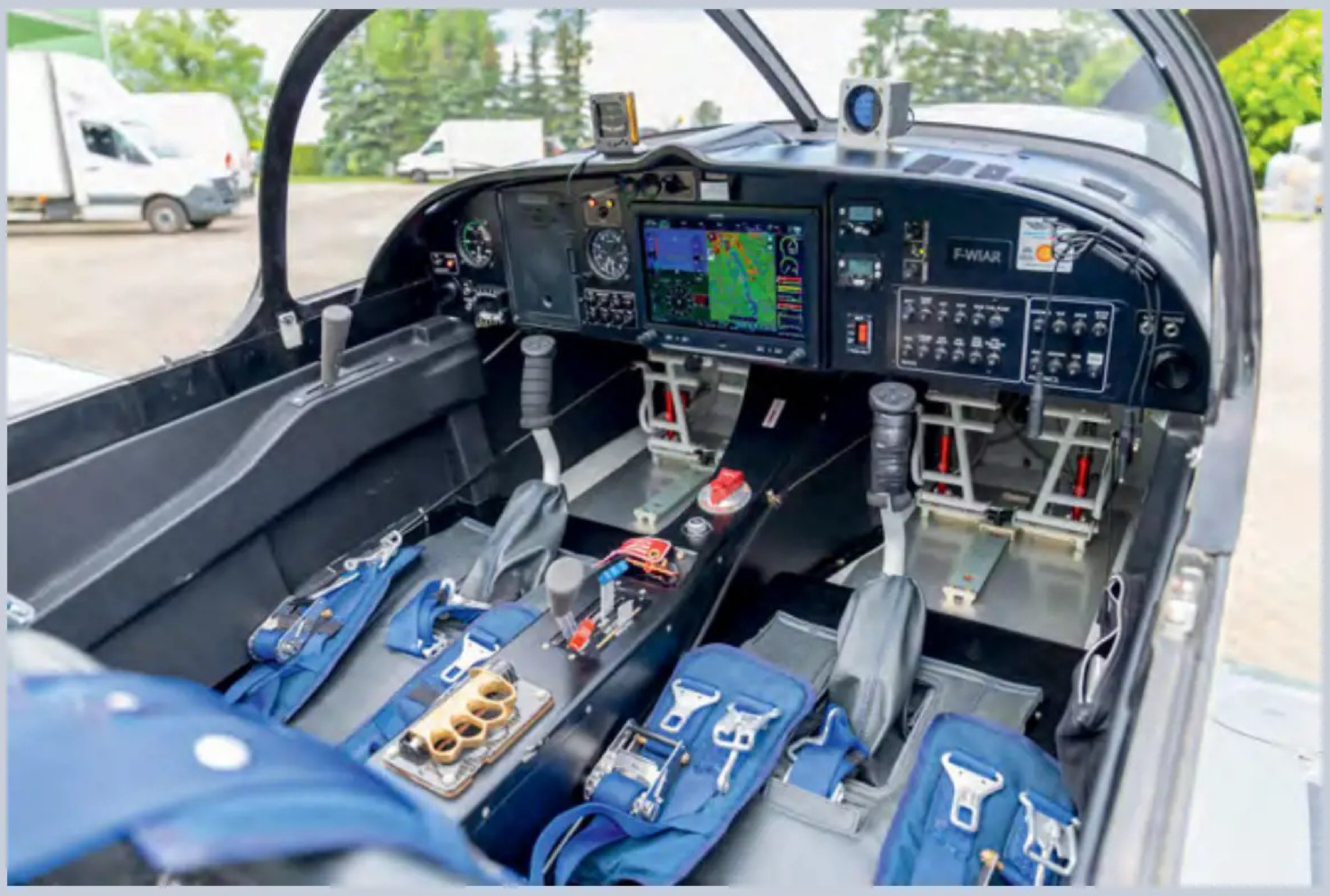


▲ The airspeed indicator is calibrated in kilometres per hour, which provides greater precision for aerobatic flying. The aircraft feels very stable in flight and requires only light control inputs

Safety and comfort

Before stepping into the cockpit, the authors' attention was caught by the aircraft's installed parachute system. "This is the first aerobatic aircraft equipped with a built-in ballistic recovery system. It is a capable setup that can save the aircraft even when deployed during inverted flight or in a spin," explains test pilot Romain.

The cockpit is minimalistic, yet well-equipped. In the centre sits a Garmin G3X avionics suite. On the right side, is a Trig radio and transponder, along with the circuit breakers. On the left, there's an analog airspeed indicator and altimeter. Directly in front of the pilot, there's no traditional six-pack layout – instead the avionics are centrally located, leaving space for mounting an iPad or aerobatic sequence card, both of which are far more practical for this type of flying.



▼ The seats are comfortable and secured with five-point Hooker Harness seatbelts. If you're shorter, a cushion might be useful. You don't often see a knuckle duster in an aircraft – here, it's meant for test pilots to use in emergencies to break the canopy

The seats are comfortable, though your legs are stretched out straight in front of you – it's not a typical chair-like sitting position. Even so, rudder pedal access is easy, and they're adjustable. You're strapped in with a five-point Hooker Harness. The central panel with the throttle, propeller and mixture levers effectively separate the space between pilot and passenger without feeling cramped. Interesting fact: the Integral R's cockpit is 20cm wider than that of the Cap-10 – a notable difference.

As mentioned earlier, F-WIAR is a prototype and test aircraft. That explains the additional instrumentation visible above the cowling, used to measure structural vibrations, and – curiously – a brass knuckle duster. It's carried by test pilots for emergency use, allowing them to break out of the canopy if necessary.

Speaking of the canopy, it opens rearward using additional actuators and has a centrally located high-visibility handle that clearly indicates whether it's fully locked or open. Currently, the canopy must be fully closed before engine start, but Aura Aero engineers are working on a certified solution that would allow for partial ventilation during taxiing.

Who and why?

So, what about market competitors and who does Bastien believe the target audience for this aircraft is? "When we talk about aerobatic aircraft, everyone immediately thinks of the Extra – and for good reason. It's an excellent aircraft for advanced aerobatics. But frankly, it's too fast and too agile to learn basic manoeuvres on, and it's too expensive to be a realistic training platform for UPRT students. That's exactly where the Integral R fits perfectly."

"In designing this aircraft, we gathered a lot of input and requirements from aerobatic pilots, flight instructors, and flight schools. At the same time, we wanted to create a better design overall – one that solves the shortcomings of competitors like the Cap 10 and delivers an aircraft that's not only fun to fly, but also highly suitable for training."

The Integral R is not meant for Unlimited or even Advanced level competition aerobatics – it's certified to ±7.5G, but is perfectly tailored to teaching foundational aerobatic skills in a safe and structured way. Students are given the chance to truly understand how to properly execute each figure without being overwhelmed.

A key role for the aircraft is in UPRT. This training requires pilots to recover from unusual attitudes and spins, and the Integral R is exceptionally well-designed for that mission, offering predictable behaviour and forgiving characteristics.

And let's not forget private owners. After all, who wouldn't want an aircraft that cruises at 150kts, has a spacious and comfortable cabin, and can also perform aerobatics just for the sheer joy of flying? The answer is obvious.

Let's Fly

After Filip put on his parachute, he found getting in and out of the aircraft was surprisingly easy thanks to a wide step, wide non-slip wing surface, and a dedicated handhold just behind the canopy.

Romain closes the canopy and start up is smooth. "Cold starts are very easy and pleasant in this aircraft," he explained, "but hot starts can sometimes surprise the pilot."

Upon taxi, it is immediately noticeable how quiet and refined the engine sounds – almost artificial. This is because the Integral R uses an electronic ignition system rather than traditional magnetos. It is a relatively new technology, but one that significantly reduces engine noise, both on the ground and in the air, making this plane much quieter than its competitors.

At around 120 km/h, the R rotates and climbs at a rate of 1,000ft per minute. Filip's immediate opinion was: "It's very stable in flight – let go of the stick, and the aircraft keeps going just as you left it. At the same time, when I bank or manoeuvre, the response is smooth and direct, requiring no significant effort. I will admit, it has been a while since I have flown something with this perfect blend of stability and agility."

The integral R maintained a steady 270 km/h. An interesting detail: the airspeed indicators are calibrated in kilometres per hour. "The main reason is precision," Romain explained. "Kilometres per hour offers much finer granularity than knots, which is especially useful in aerobatics." Of course, each owner can set their preferred units on the Garmin G3X.

After performing multiple aerobatic manoeuvres in the aircraft, it was clear that the 210hp engine offers generous energy reserves, allowing the crew to perform loops between 210 and 300km/h, without needing to dive for speed.

Filip added: "Executing aerobatic manoeuvres in the Integral R is a true pleasure. The aircraft responds directly and precisely to control inputs, and each figure is performed smoothly and predictably. Pace is not excessively fast, unlike in some other aerobatic machines, giving both the pilot and any potential student time to understand the manoeuvre and refine their technique."

The aircraft has a roll rate of 180° per second, which means it can complete a full roll in just two seconds. A pilot can disable the electric trim system via a switch in front of the cockpit, preventing any unintended inputs during aerobatics.

After the aerobatics and in the airfield's circuit, the landing procedure is straightforward. Slow down to 145 km/h, turn on the lights and fuel pump, then descend in a gentle slip for better runway visibility, and touch down in a classic three-point landing. Filip concluded after the flight: "This flight proved to me just how well-designed and well-thought-out this aircraft truly is. I have no doubt the Integral R will become a popular choice for aerobatic schools and private pilots across Europe and the US." AN

▲ Romain climbs in the aircraft for a flight above Poland with the author Filip

▼ The power source behind the aircraft is the 210HP Lycoming engine, allowing it to cruise at 270km/hr

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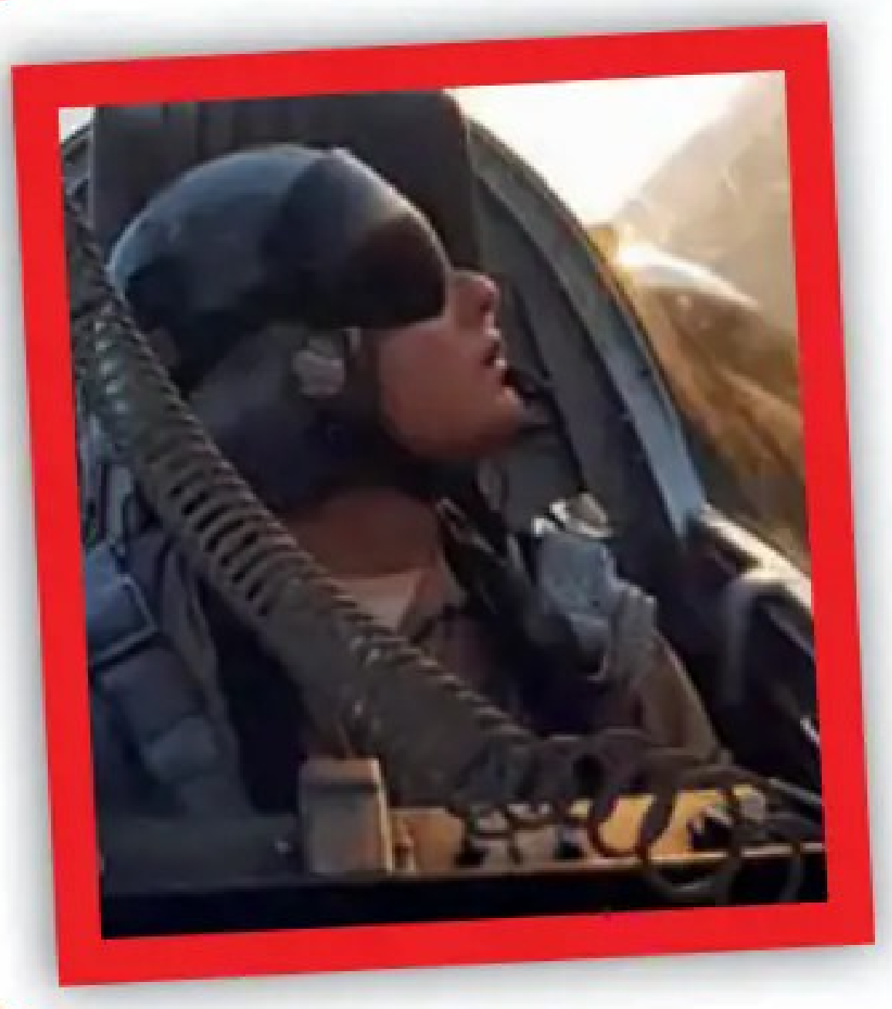

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AVIATION NEWS

A Boeing 777 rotates towards the setting sun at Los Angeles International Airport (LAX), creating some wing condensation and wing tip vortices. Rohan Patel

FIGHTING FIRES WORLDWIDE

What makes Conair Group Inc. an innovative leader in the aerial firefighting world? **Aaron Burton** takes a look at the companies home base

Based in Abbotsford, British Columbia (BC) Canada, Conair Group Inc. owns and operates a fleet of 70 aerial firefighting aircraft which operate throughout the world, contracting to Canadian provinces and territories (including the Yukon, Alberta, and BC), Australia, including Victoria, New South Wales and Queensland, and across the US, primarily through their subsidiary company Aero-Flite Inc., headquartered in Spokane, Washington.

A history of retrofitting

Conair was formed in 1969 as a spin-off from Skyway Air Services which mainly focused on aerial application before retrofitting aircraft for firefighting. Over its 50-plus years, the company has developed hundreds of its own Supplementary Type Certificates and converted over 15 types of aircraft for aerial firefighting. Back in the early days, starting with Grumman Avengers and Boeing Stearmans, Conair massively upgraded their fleet in the 1970s and 1980s with Grumman S-2 Trackers and Douglas A-26s, then DC-6s, becoming the first North American company with an air tanker retrofitted with a 3,000-gallon tank. Their birddog fleet at the time consisted of Cessna 210 and 337s along with Piper Aerostars. (A birddog acts as a lead plane, guiding air tankers to drop locations and ensuring safe operations.) Later, with the gradual switch to turbine-powered aircraft, Conair converted three Fokker F27 aircraft which saw a shorter service life with the company than their one Lockheed L188 Electra and the numerous Convair CV580s they operated until 2022.

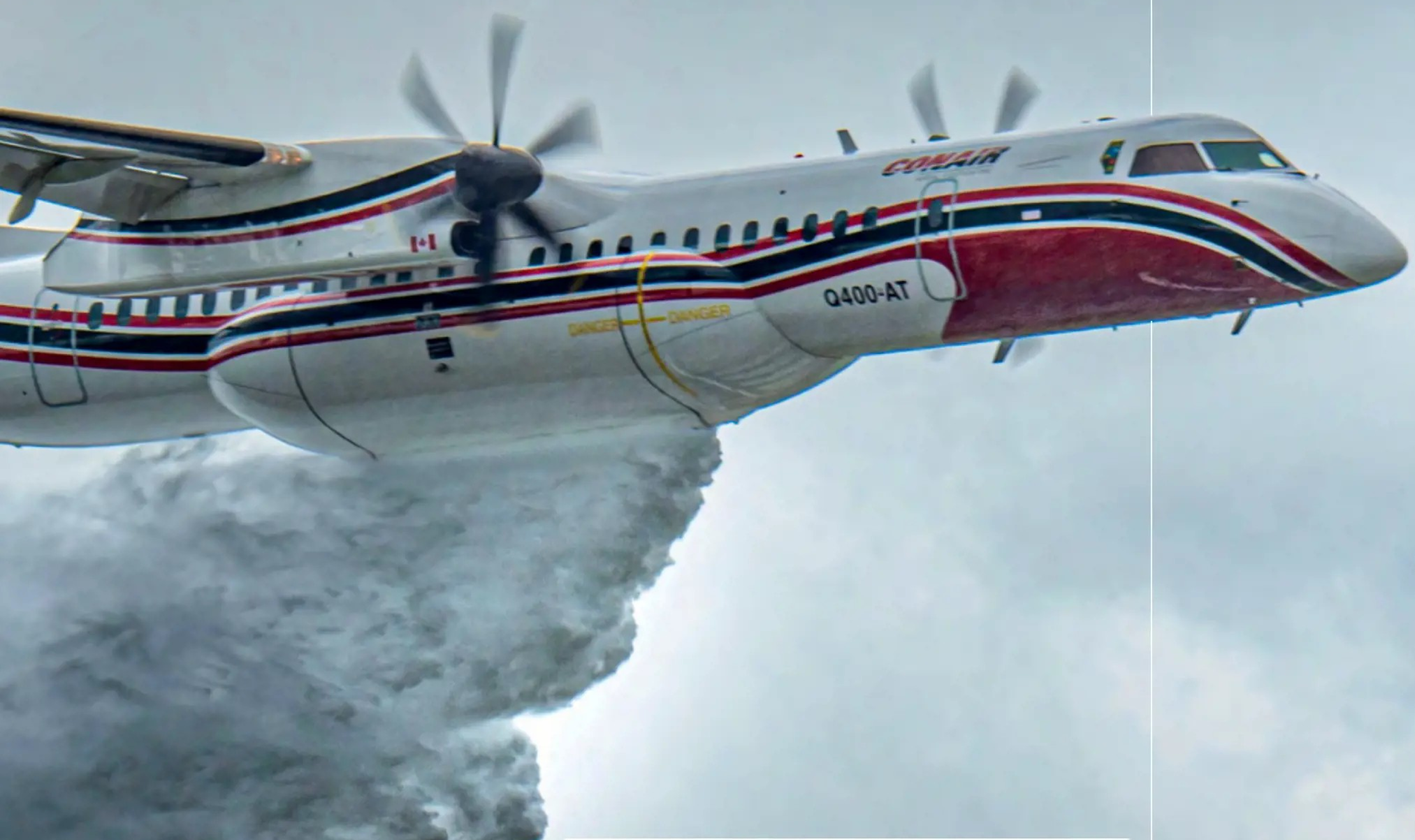
Long-term contracts

Unlike other companies that might run on a 'call when needed' basis, nearly the entire fleet of Conair aircraft are on long-term contracts. Most of these contacts are around 90 to 120 days in length which cover the peak wildfire months. Some contracts have been extended to a period of 15 years so agencies can better predict their wildfire needs going forward as well as budget.

Mike Benson, Conair's Director of Business Development, explained: "Every year we receive calls from governments in dire need of aircraft to fight wildfires occurring in their region in an ad hoc manner. And nearly always we cannot assist. Very few of our aircraft are available for Call-When-Needed operations. I believe many fixed wing aerial firefighting operators are in the same position. This type of reactive response results in high costs for the contractor plus an unstable financial environment for the operator. The costs to maintain an aircraft fleet are high. Plus, you have to plan for long periods of time for heavy maintenance, crucial for safe operations. Proactively building a fleet for the long-term ultimately reduces costs for the government agency, plus increases the ability of the operator to invest in additional aircraft or incorporate new technologies. Wildfires are only going to increase in number and intensity. Agencies that act now to build their own fleet for the future will be able to protect their citizens, communities, and resources from those fires."

Current fleet

Conair operates a diverse fleet providing air attack, birddog services, and fire suppression or



FIREGUARD 548 performing a practice water drop onto the Abbotsford Airport Runway before deploying for the season
All images Aaron Burton

A Conair pilot performs preflight checks prior to a training flight in Conair's Turbo Commander Simulator

▲ A Conair RJ85 undergoing heavy maintenance at their Abbotsford Base after returning from Australia

containment services with amphibious air tankers and land-based air tankers. Conair's birddog fleet continues to modernise with the addition of the new Daher TBM 960 which will eventually replace their TC-690 Turbo Commanders and work alongside their Cessna 208 Caravans. In Canada Conair operates the Air Tractor AT802F amphibious water bomber and in the US their Aero-Flite division operates the well-known and trusted Canadair CL-415. The land-based air tanker fleet consists of the Avro RJ85 heavy tanker, the Air Tractor AT802 on wheels and the Dash 8-400 heavy tanker.

▼ Conair's new birddog aircraft, the Daher TBM 960 taxies out for a training mission.

Dash 8-400/ TBM

Conair has chosen the de Havilland Dash 8-400 as its next generation air tanker, replacing their one Lockheed Electra and Convair 580 fleet which were turbine conversions of the 1950s piston-powered Convair regional airliner. Beginning in 2005 with the first conversion of a Dash 8-400 for the French Government, Conair has continued to convert Dash 8 airframes to fill their own needs and those for the French, and most recently the Saskatchewan Government, signing a roughly $187m contract for two Air Tanker and two Multi Role variants in 2024. Benson stated: "We are in the process of manufacturing the Dash 8-400AT and its multi-role variant for Saskatchewan, Canada, the first of which was delivered in May. We will be delivering the final three aircraft over the next two years."

The French Government operates eight Dash 8s, both the air tanker and multi-role variant. Eleven Dash 8-400s were purchased by Conair in 2021, the airframes having been previously operated by UK airline, FlyBe. The Dash 8-400 is offered in two variants; a dedicated air tanker and a multi-role variant called the Dash 8-400MRE. In addition to providing the same firefighting performance as the regular Air Tanker variant, the Dash 8-400MRE, is, according to Benson, the only emergency response aircraft of its kind in the world. He said: "It is certified to respond to wildfires as a large airtanker, dropping water or retardant, plus can adapt within hours to provide other critical roles. It can evacuate citizens, transport crews and cargo, ship humanitarian supplies, and medevac critically ill patients. We are investigating incorporating Intelligence Surveillance & Reconnaissance capability. It is a versatile aircraft, already certified, with a 20-year history of successful operations, with France owning and operating a fleet of eight."

Conair is the developer and authorised company capable of converting Dash 8-400 and Avro RJ 85 aircraft with their own specially designed external tank. This tank does not compromise the aircraft airframe by cutting away the fuselage, instead it is mounted to the outside and conforms to the shape of the fuselage. By attaching the tank to the outside of the fuselage it allows the aircraft to remain pressurised and climate controlled.

Air Tractor 802F air tankers lined up on the Conair Apron in Abbotsford, British Columbia

Built in house at their Abbotsford base, they are tested and fitted to aircraft undergoing conversion. Overall, the conversion process takes around 75 days. To begin with, the interior is stripped down to the bare frame to reduce weight and then the cockpit is taken apart. Conair installs specialised avionics to include a Conair developed and Transport Canada approved Flight Envelope Awareness System which provides the crew with crucial information like instant G loading on the airframe, slow speed awareness and angle of attack info. It takes around eight weeks to install and carry out avionics' upgrades and another two weeks to reassemble the cockpit and run the aircraft through initial tests and flight trials. To date, Conair has converted 20 Dash 8-400s to air tankers or the multi-role variant, 15 of those being converted in the last four years.

Conair has just launched their new birddog, the Daher TBM 960. At the time of writing, the company operates two of the type in British Columbia. There are plans to add more to the fleet after a large amount of interest was shown in this new aircraft. As mentioned, The TBM 960 will replace Conair's ageing fleet of TC-690 Turbo Commanders as maintaining these older aircraft is becoming more difficult as the parts supply dwindles.

"Both the TBM and Dash are modern aircraft available for purchase today with delivery next fire season for an agency in need. I don't believe any other organisation in the world can make that statement," Benson stated.

▲ An Air Tractor performs a practice water drop. The 802F can hold around 3,000 litres of water

◀ Conair Crew members observing a fire during a simulator session

Training

To train its crews for upcoming fire seasons, Conair's Training and Tactics Centre is the world's largest aerial firefighting training facility. Their K Barry Marsden Training Centre houses a Level D Transport Canada certified full-motion Avro RJ 85 simulator, the last one ever produced. And in its own dedicated hangar are flight training devices with an emphasis on the Air Tractor 802 and other fleet types. Conair has both Level 4 and 5 AT802F simulators for both wheeled and amphibious operational training, the Level 5 being one of only two in the world certified for the AT802F. A one of a kind and first in its class, Mission Training System at Conair allows for up to six integrated Flight Training Devices (each Level 4 TC certified) to operate together under simulated wildfire training conditions and scenarios. Aircraft included in this system ranges from air tankers, like the Dash 8-400, RJ85 and AT802F (floats and wheel), to their birddog fleet of C-208s and TC-690Bs. The simulator can mimic real-life fire scenarios and respond to retardant or water drops made by pilots flying the aircraft associated in the scenarios.

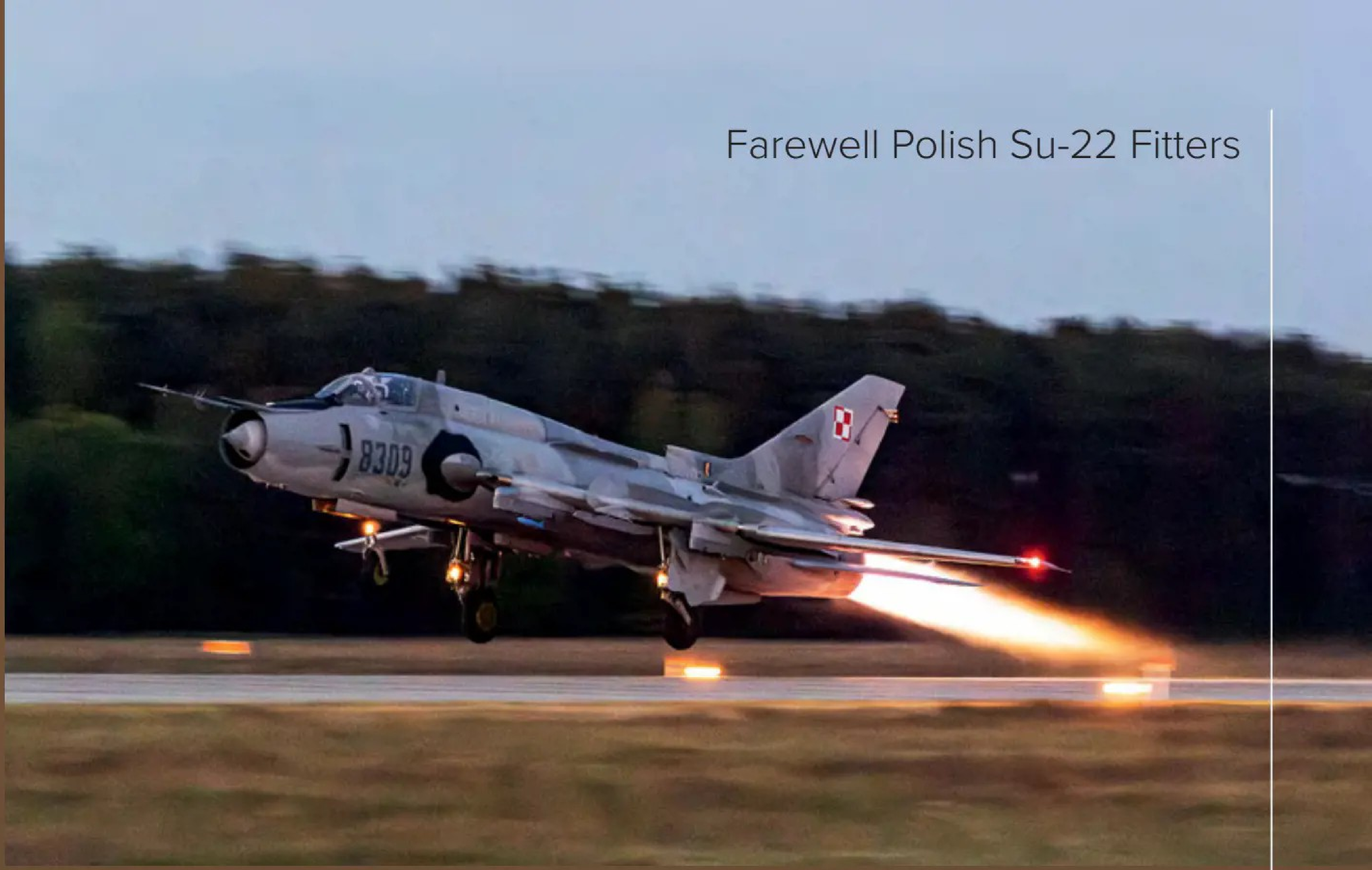
Conair continues to modernise and grow its fleet and the company's capabilities include expanding their maintenance capabilities such as its in-house Non-Destructive Testing of aircraft airframes to ensure the airframes in their fleet withstand the future challenges of aerial firefighting. AN

561
C-GVFH
CONAIR

▼ Conair's RJ85 callsign FIREGUARD 561 returning to Abbotsford after a pre-season training flight

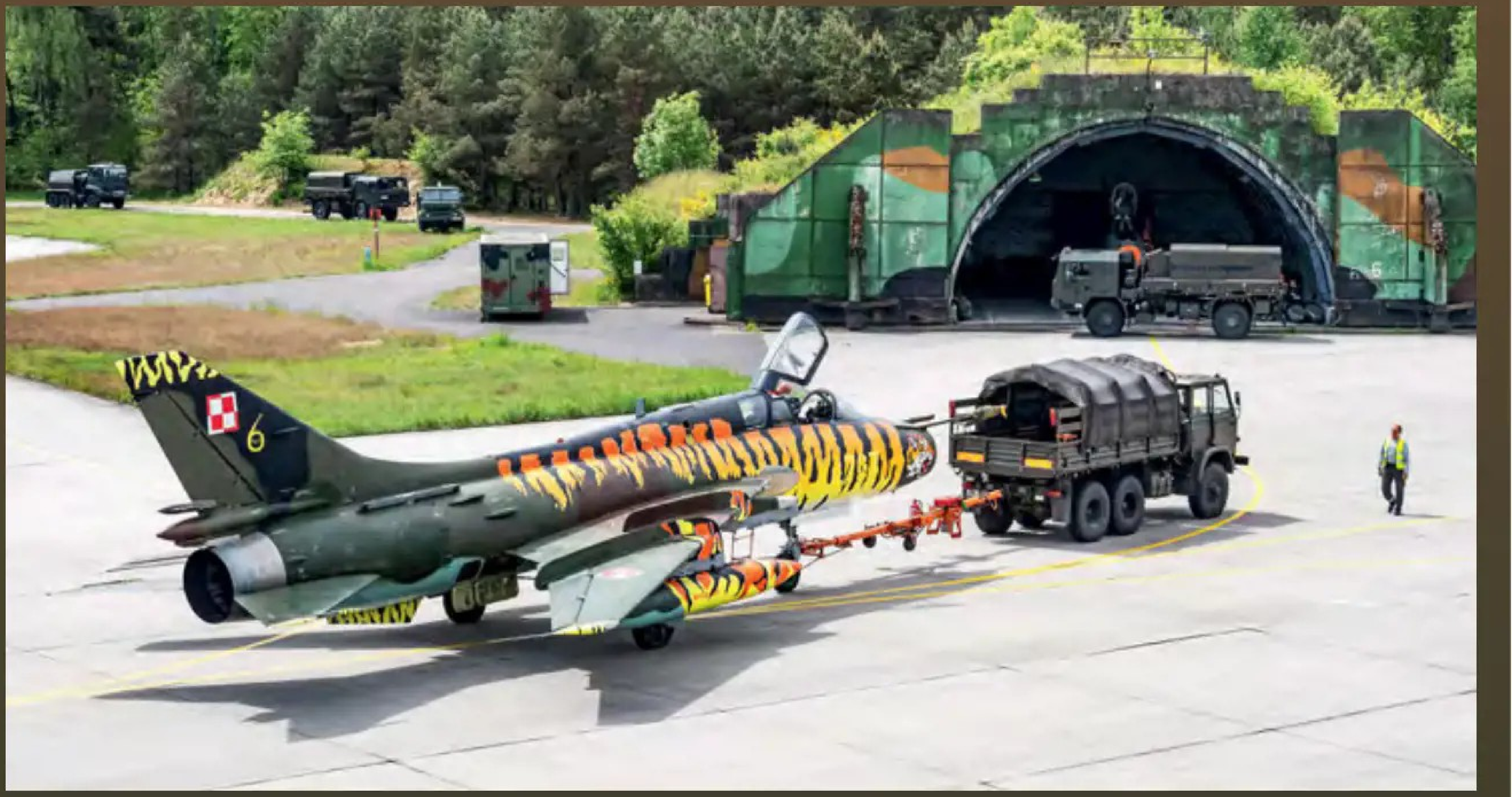
FAREWELL Fitter

Rich Cooper, alongside a small group of other photographers, had the honour of shooting the last SU-22 *Fitters* in Europe during a centre of aviation photography event at Mirosławiec air base.

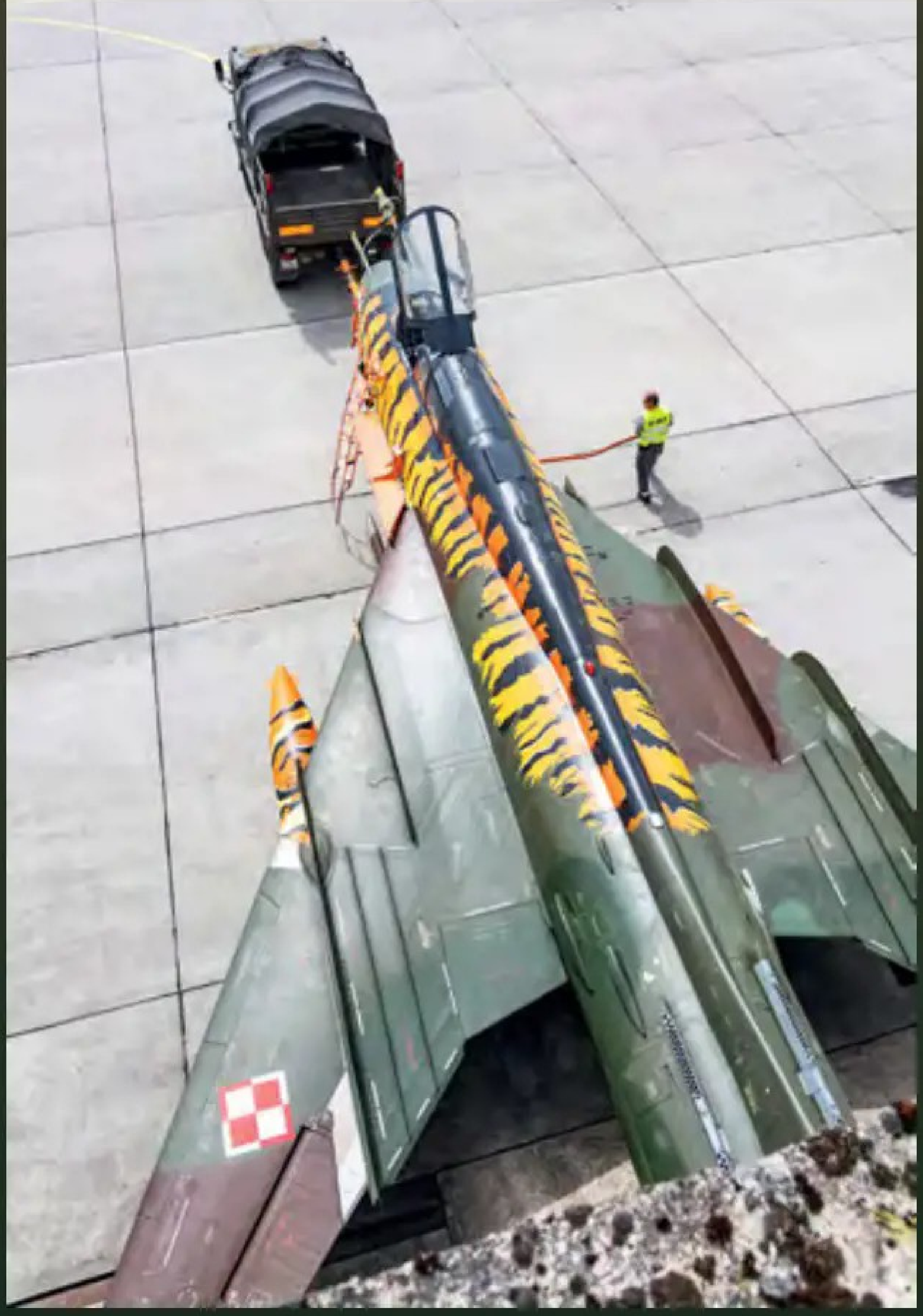


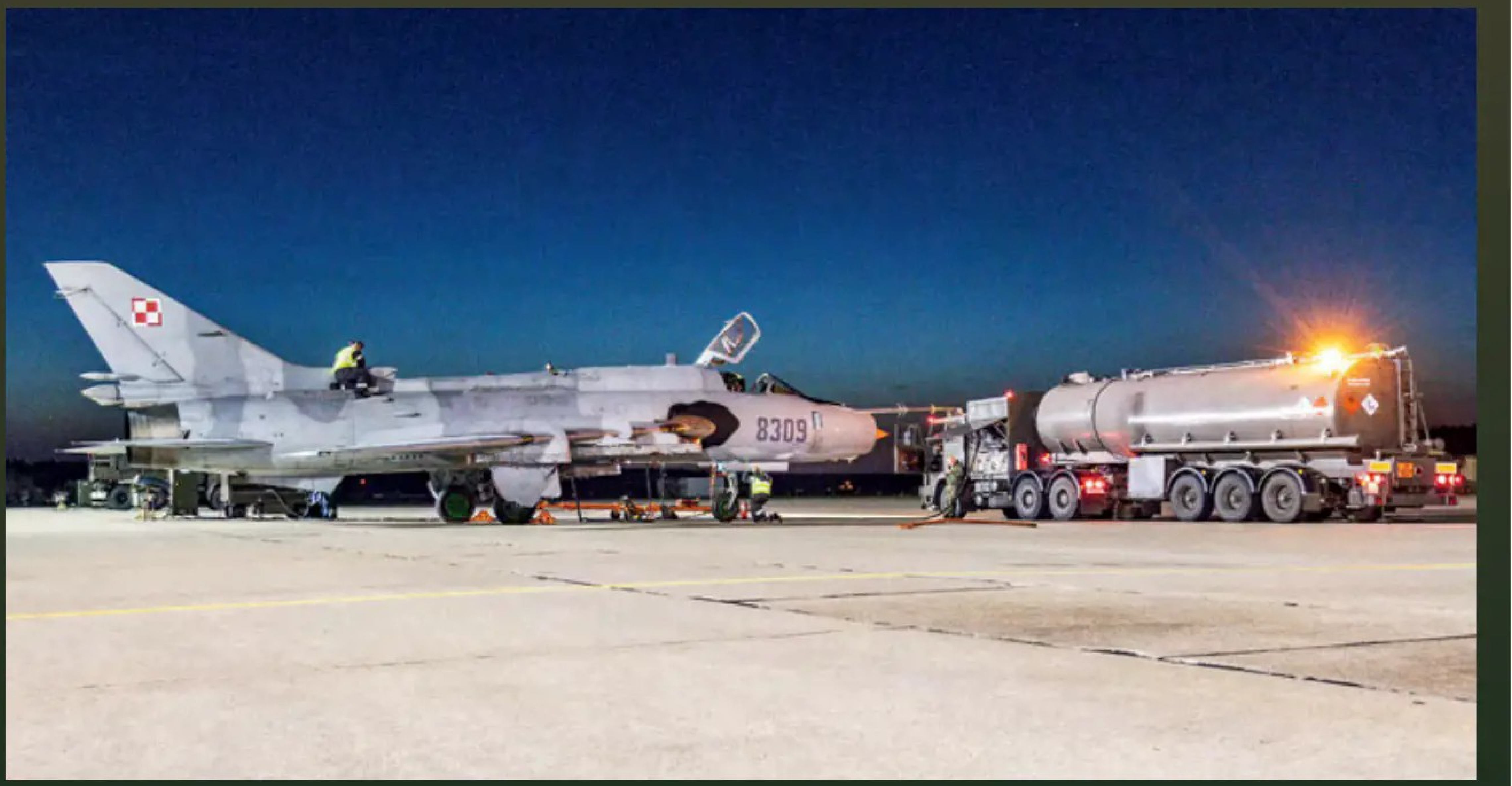
▲ Mirosławiec missile: A Polish AF Su-22 *Fitter* blasts out of Miro base at dusk with its Lyulka AL-21F-3 engine in full burner. The type is in its last days of operation, as Poland undergoes a huge military modernisation

◀ Su-22UM-3K 509 is caught here at the start of a night mission, just as the afterburner thumps into life. Miro holds a special place in the hearts of all who have served there, thanks to the unique character of the base. It has already begun a modernisation programme to become a prime centre of Polish AF UAV operations



▲ Tiger in the trees: The Polish Su-22 *Fitter* fleet is spending its final day's operation at Mirosławiec air base (12. Baza Bezzalogowych Statkow Powietrznych/12. BBSP), a place full of character in the northwest area of the country. The Su-22 wing is actually headquartered at Swidwin (21. Baza Lotnictwa Taktycznego/21.BLT), but this base is undergoing preparation for the Polish AF's F-35 Lightning II arrival, so the *Fitter* fleet moved to Miro once construction started



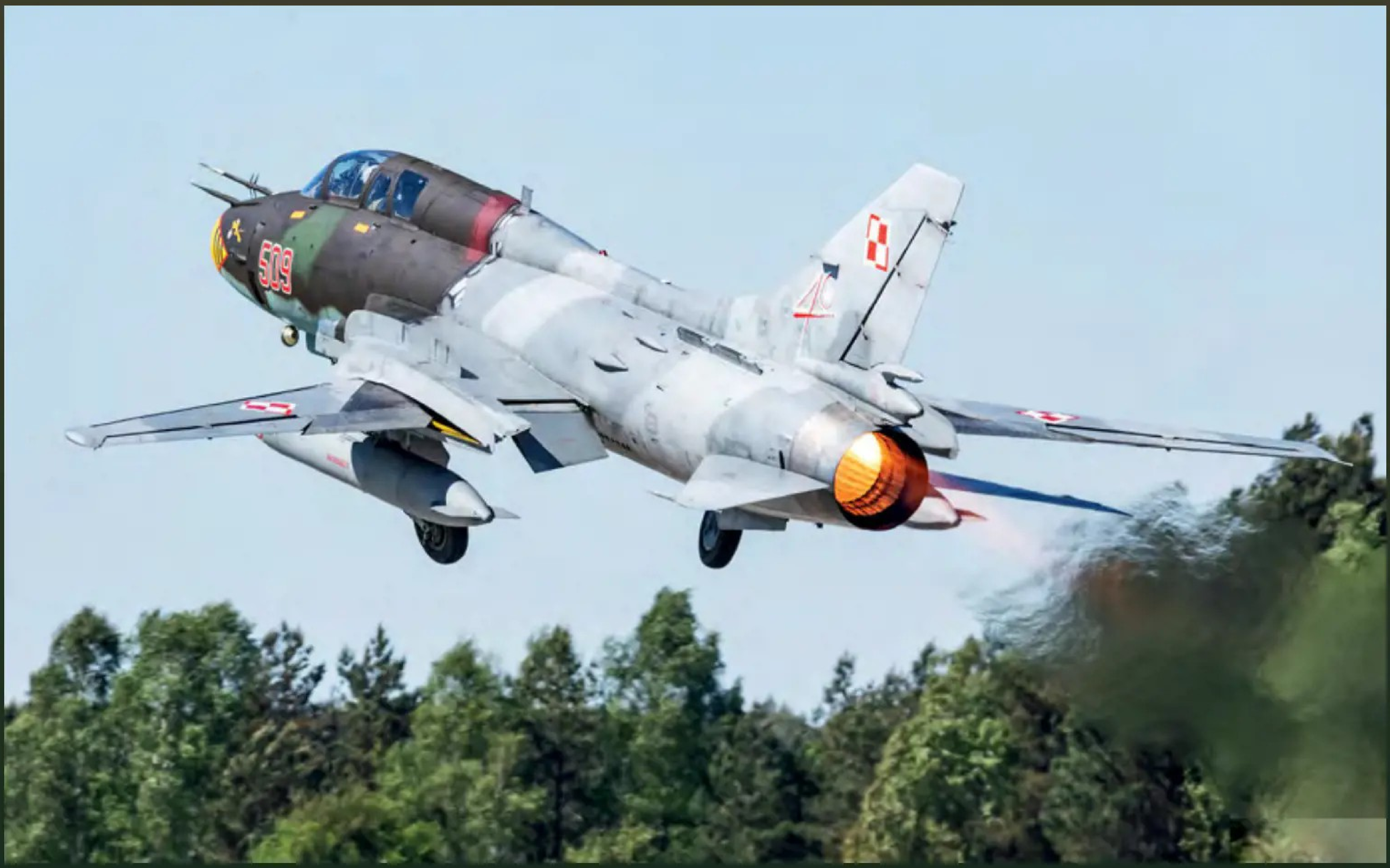


▲ Although retirement is imminent, night flying remains commonplace for the PLAF Su-22 *Fitter* fleet. Here, a single-seat Su-22M4 is refuelled immediately after shut-down following a number of sorties throughout the day/night period

◀ Tiger on a leash: Su-22 *Fitter* number 707 wears a stunning Tiger paint scheme, which was recently re-applied after overhaul. It is seen here being pulled out of one the characteristic shelters at Mirosławiec ahead of the day's flying

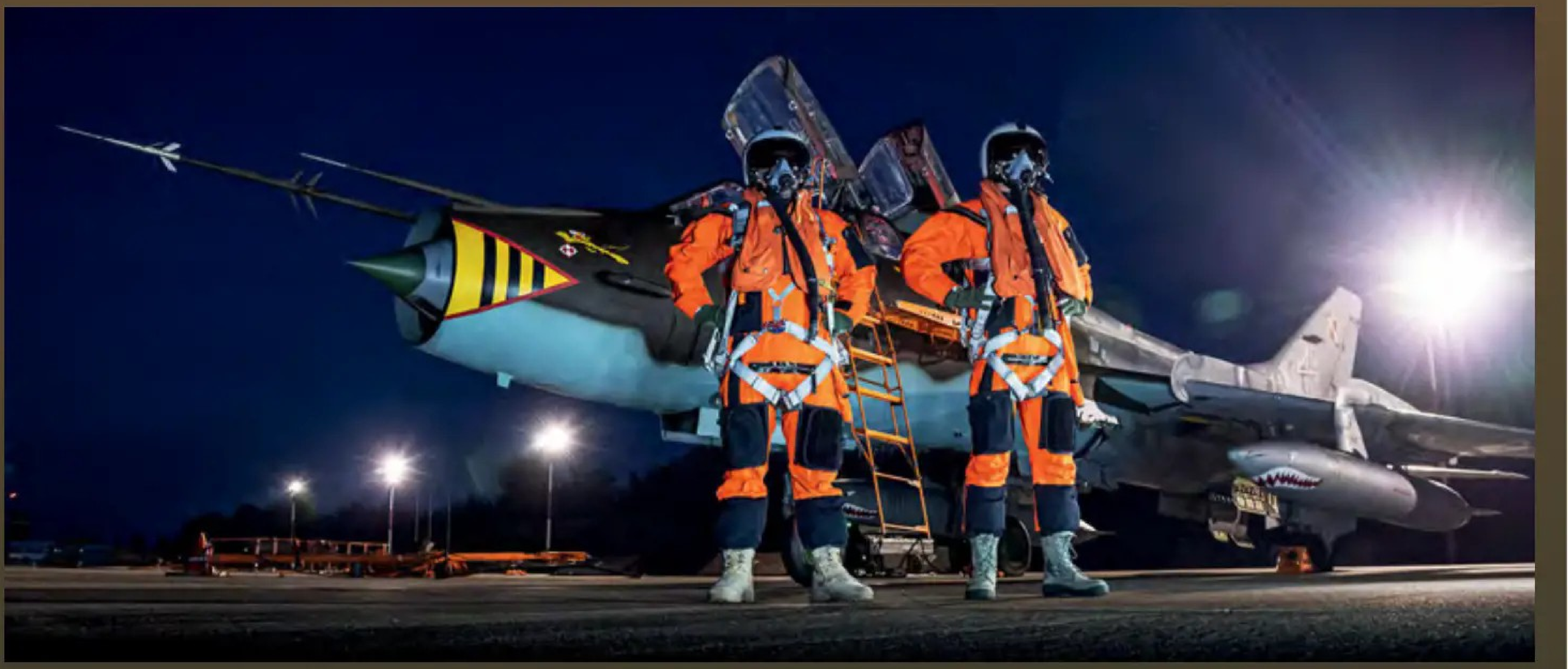
Snapshot

▲ Col Roman Stefaniak, base commander of 21. Baza Lotnictwa Taktycznego (21. BLT) at Świdwin, sits in his Su-22 *Fitter* on the Mirosławiec flightline. The last flight will take place in early September



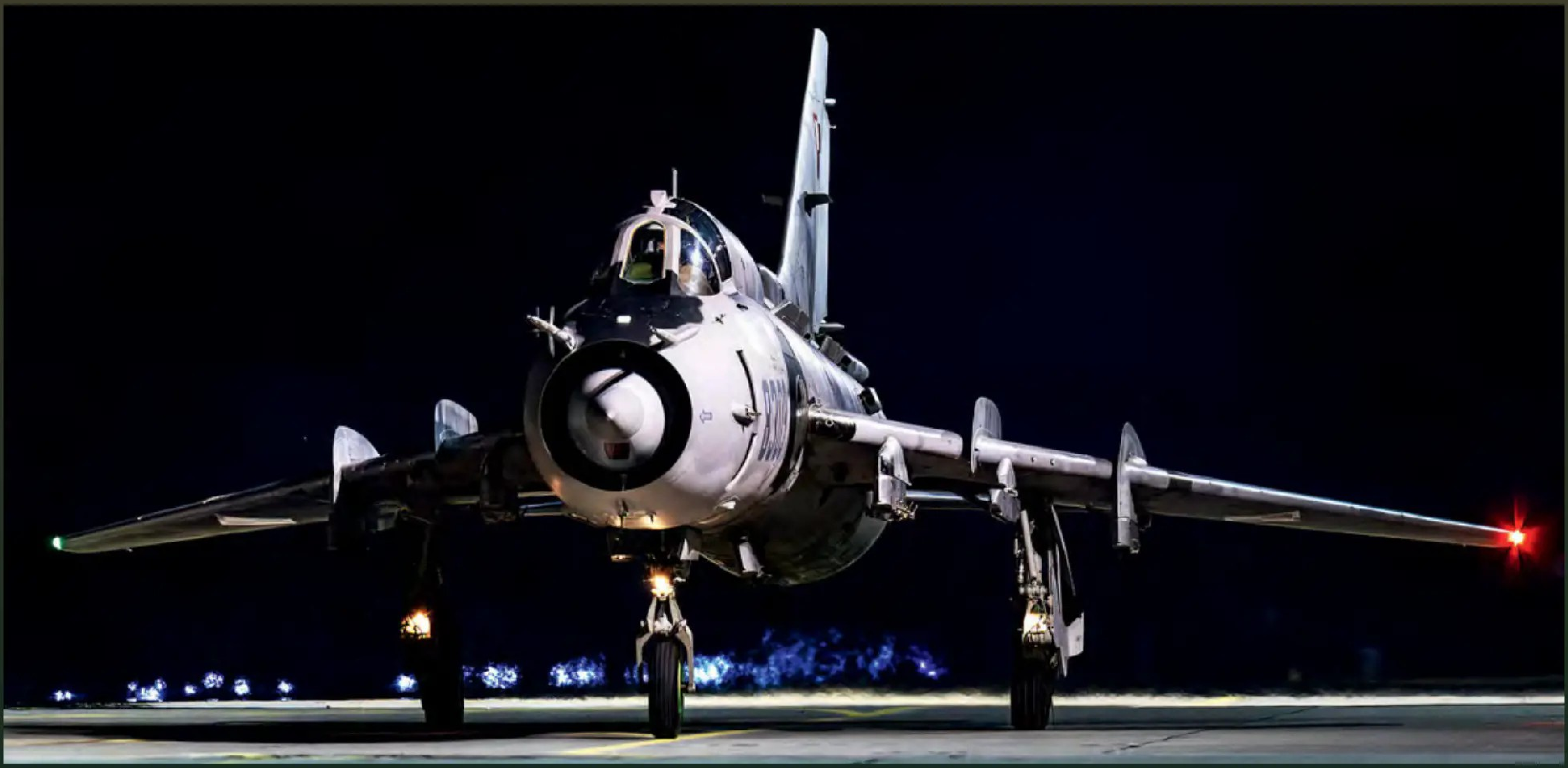
▶ This stunning scheme is applied to two-seat Su-22UM-3K number 509 to celebrate 40 years of *Fitter* operations. It features the original camouflage on the nose and morphs into the current two-tone grey aft of the cockpit area

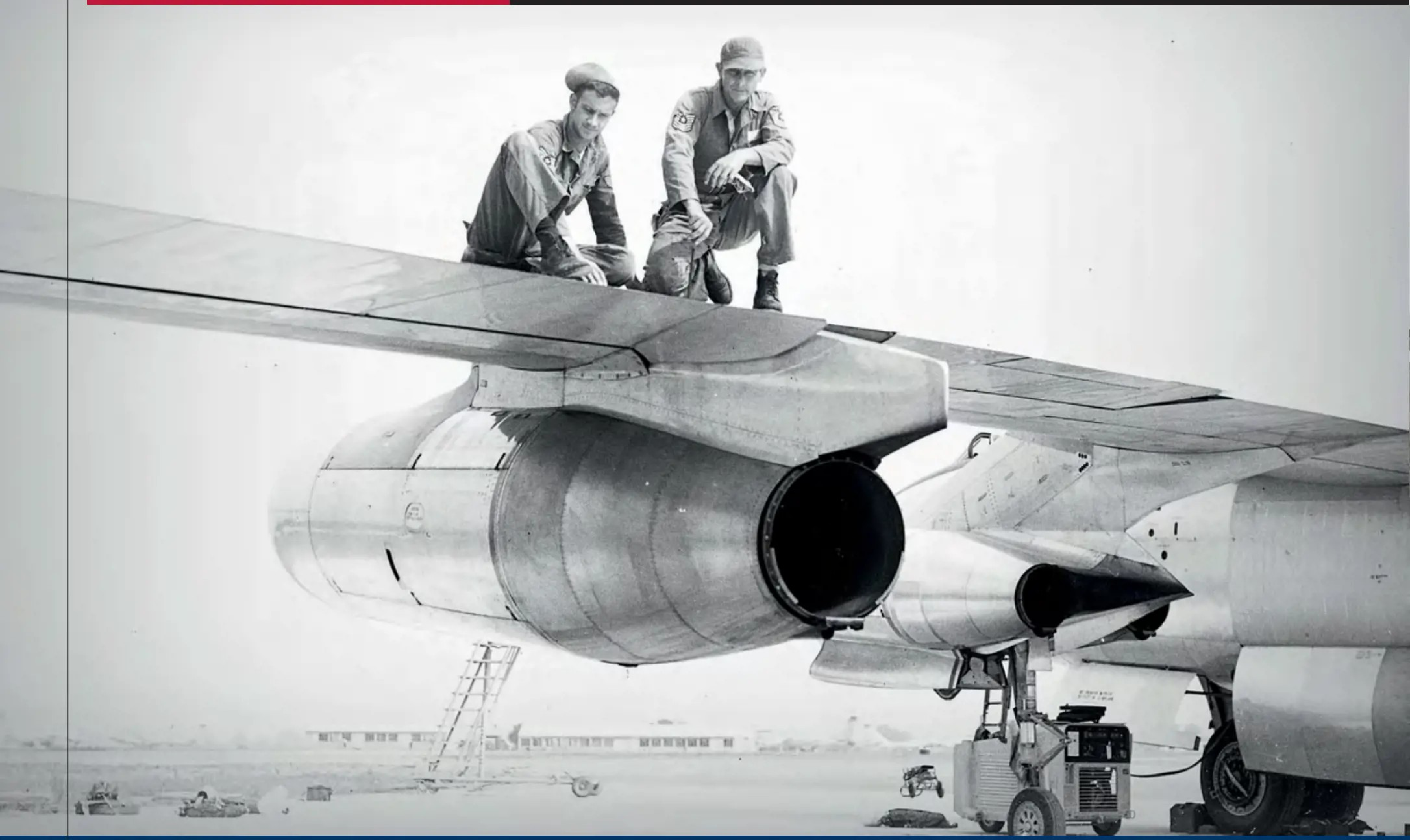
▲ *Fitter* flightline: The days of the last Su-22s in Europe and NATO are numbered. The last training flights were finished in May, leaving just operational sorties to continue – the final public appearance was to be at Radom Airshow at the end of August, with the final flight then taking place around two weeks later from Miro base



▲ Two of the last Su-22 pilots of the PLAF pose in front of their jet having just completed a night close air support (CAS) mission over the sea – complete with the necessary equipment and flight suits for cold water survival

▼ A single-seat Su-22M-4 *Fitter* returns to the Miro flightline at night. This design – with its nose intake and swing-wings – will never be seen again





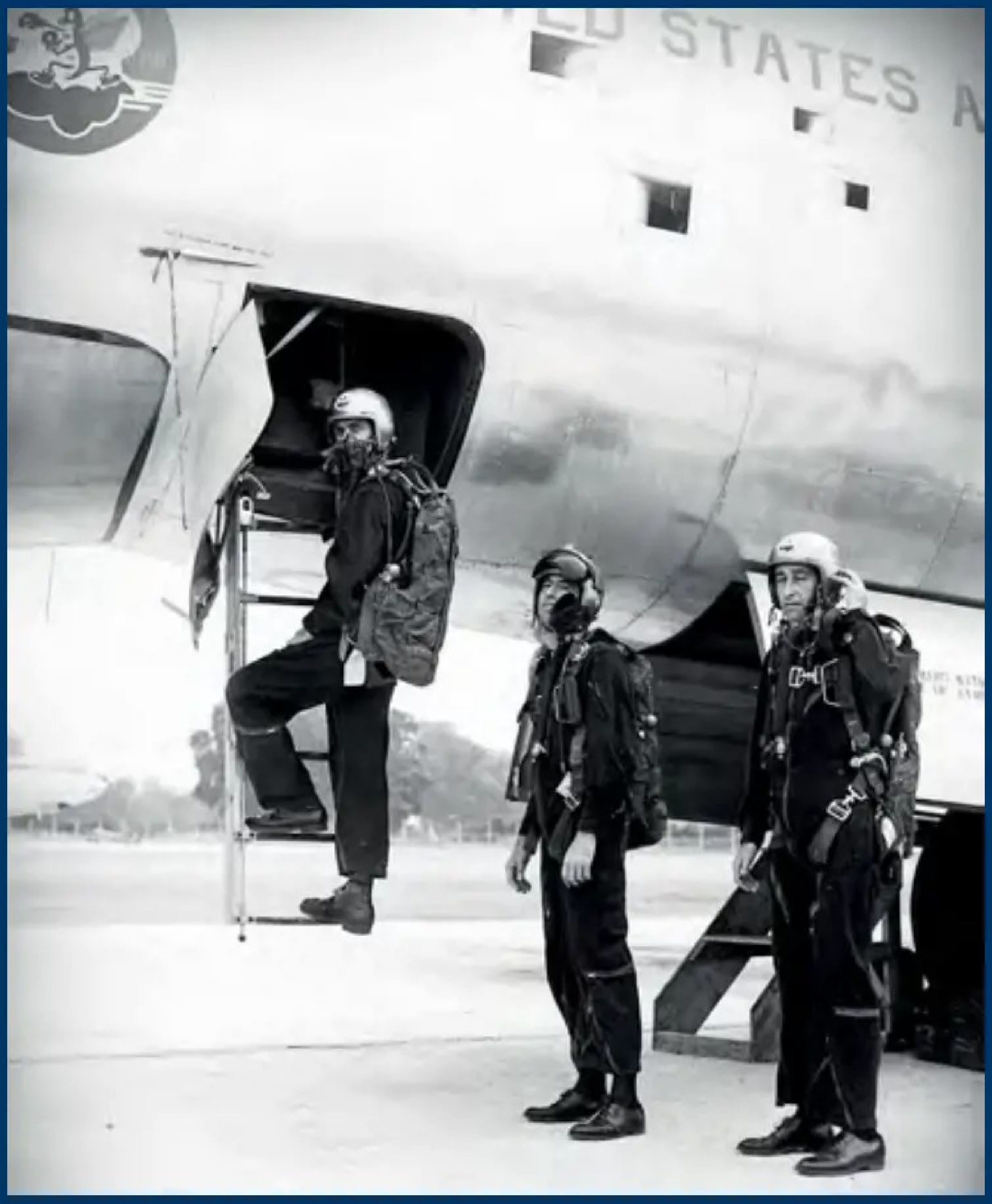
STRATOJETS at FAIRFORD

We share recently discovered images of the 306th Bombardment Wing's Boeing B-47 Stratojets at RAF Fairford in 1953 – during the type's first overseas deployment

▲ Groundcrew pose on top of a B-47's wing while working on the jet's port outer General Electric J47-GE-23 turbojet

In June 1953, RAF Fairford in Gloucestershire welcomed 45 Boeing B-47 Stratojets of the USAF's 306th Bombardment Wing (BW) – comprising the 367th, 368th and 369th Bomb Squadrons – from their homebase of MacDill Air Force Base (AFB) in Florida. Assigned to Strategic Air Command (SAC) and led by Col Michael McCoy, it was the wing's first full deployment since equipping with the six-engined, turbojet-powered strategic bomber in 1951. At the time, the 306th was tasked with developing combat procedures and flying techniques for the entire B-47 force.

Departing MacDill in three waves on June 2, 3 and 4, respectively, the jets routed through SAC's base at Limestone (today's Loring Air Force Base) in Maine; 15 jets arrived at Fairford on the 4th, 12 on the 5th and 16 on the 6th, while two 'stragglers' touched down on the 7th.



▶ A crew from the 369th Bomb Squadron climb aboard a B-47 at Fairford in late June 1953. The crew consisted of a pilot, co-pilot and a bombardier ALL IMAGES KEY COLLECTION

On strength with the 369th Bombardment Squadron, Boeing B-47B-45-BW Stratojet 51-2273 awaits its next sortie at Fairford. One of 691 examples rolling off Boeing's production line in Wichita, Kansas, in 1953, the jet was retired to the Military Aircraft Storage and Disposition Center at Davis-Monthan AFB in Arizona on September 22, 1960, where it was ultimately scrapped

▲ Five 368th Bombardment Squadron Stratojets were headed by 51-2074, which was later modified as a non-combat TB-47B trainer, and shared the flightline at Fairford in June 1953

◀ A steely eyed Stratojet 'driver' from the 369th Bombardment Squadron prepares for his next sortie from Fairford in the six-engined, turbojet-powered strategic bomber

Supported by 20 Boeing KC-97E Stratotankers of the 306th Air Refuelling Squadron, which had deployed from McDill to Mildenhall in Suffolk, the wing took part in Operation Big League on June 29/30. Designed to test the 306th's capability against targets across continental Europe, results were poor – primarily due to unfavourable weather.

With additional training missions undertaken across the wing, the desired results were gained during a simulated Emergency War Plan mission on July 16; with 44 jets launched, 40 of the sorties were deemed 'effective' over their targets. The following week, the 306th took part in Exercise World Series with similar results.

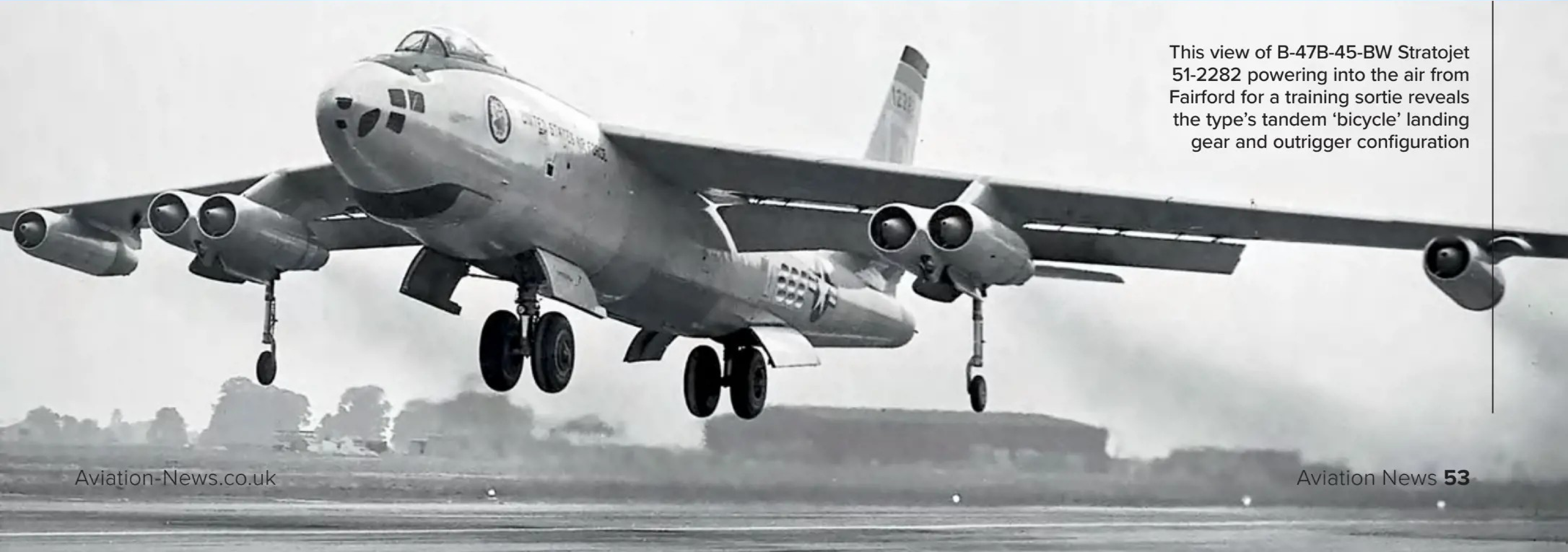
As the B-47's first overseas deployment, the 306th rotation was highly publicised and received visits from several officers and officials – including Commander in Chief Strategic Air Command (CINCSAC) Gen Curtiss LeMay, and Vice-CINSAC Gen Thomas Power.

On August 4, the 306th was allocated another B-47. Flying direct from Goose Bay in Canada to Fairford in just 4hrs 14mins, the jet turned over the Gloucestershire base and flew 4,450 miles back to McDill – thus setting an unofficial record time for crossing the Atlantic and becoming the first aircraft to make a non-stop return transatlantic flight.

Six of the wing's B-47s relocated to SAC's Nouasseur Air Base in French Morocco to evaluate the facility under Operation Safari in August.

The 306th returned to McDill – three waves of 15 jets departing on September 4, 5 and 6, respectively. AN

Boeing B-47B-45-BW Stratojet 51-2257 of the 367th Bomb Squadron taxies for departure at Fairford


This view of B-47B-45-BW Stratojet 51-2282 powering into the air from Fairford for a training sortie reveals the type's tandem 'bicycle' landing gear and outrigger configuration

▲ **A BAE Systems test pilot prepares the cockpit for a night-time test flight while wearing Striker II** Photos BAE Systems

A striking development

Nigel Kidd, Business Development Director at BAE Systems, talks to Aviation News about the Striker® II fighter pilot helmet — a groundbreaking innovation designed to enhance many aspects of piloting a fast jet on the front line

Technology is what writes the rules of warfare. Pilot helmets, more commonly known as Helmet-Mounted Displays (HMD), are now an essential part of the package when it comes to a fighter platform executing its mission. As well as top-level protection in the case of ejection, the modern-day helmet can provide flight data, situational awareness, tracking and targeting of adversaries and cueing of weapons – all within the pilot's visor.

A technology that does that today is BAE System's Striker® I helmet; it has done so since 2009 when the company introduced it into service with the countries that jointly developed the Eurofighter Typhoon. Striker I is still an advantageous piece of equipment utilised by the RAF, Italian, German and Spanish Typhoon pilots. It is also used by pilots flying the Saab JAS-39 Gripen. The helmet was developed in the late 1990s to early 2000s. Technology has advanced a great

deal since then and BAE Systems are in the process of developing its successor, the Striker II HMD.

BAE Systems has been developing Striker II since September 2023, when it was awarded a UK Ministry of Defence contract worth £40m to develop the new HMD for the Typhoon. In December 2024, the consortium behind the Eurofighter Typhoon awarded BAE Systems a £133m contract to further develop the Striker II. Commenting on the latest contract, Nigel Kidd said: “The contract enables us to drive to a schedule to deliver this capability as quickly as possible. We’re currently procuring a lot of material to manufacture multiple helmets to perform the formal testing. So, it’s full steam ahead now.”

The HMD is designed, assembled and tested at BAE System’s facility in Rochester, Kent. Flight testing is performed at the company’s site at Warton Aerodrome in Lancashire.

A clear nuance between Striker I and Striker II is the colour change; Striker I is grey while Striker II carbon black. The newer helmet is made of carbon, a much lighter material than that used on the Striker I which is coated in grey paint that contributes to the weight of the helmet. Another visual difference is the Night Vision Camera (NVC) embedded in Striker II (we will dive into that feature later). When it comes to what isn’t as clearly visible, Kidd stated: “Although the helmets look similar, we’ve changed everything under the skin, and that’s with a lot of learning and a lot of optimisations going on. What mainly differentiates Striker II from Striker I is it’s an all-digital platform.”

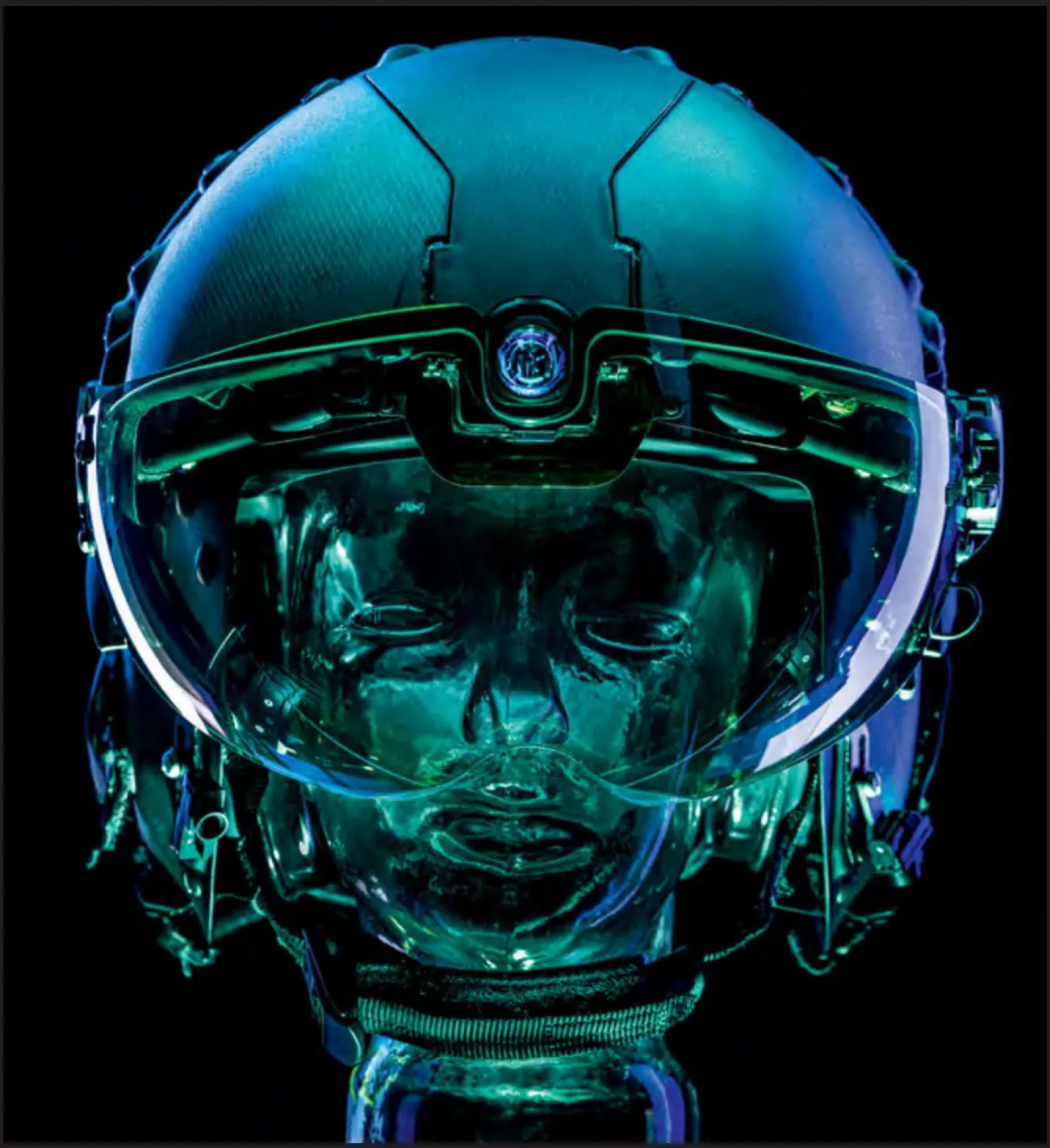
With Striker I, the best technology that was available was effectively analogue cathode ray tubes for developing bright images. Kidd explained: “With that, you’re limited in terms of the resolution of image that you can display. You’re also dependent on having high voltage drive signals going up to the helmet, which means that you can get reliability issues. As analogue items tend to drift over a period of time, you need regular scheduled recalibrations and maintenance of those analogue systems to get everything accurate and back into alignment.”

Those recalibrations are every 15 weeks for Striker I, meaning the pilot must give up their helmet during that time. This creates a downtime for the helmet and the pilot, a limiting factor BAE Systems wanted to eliminate. Nigel added: “Typically, what tends to happen is the pilot’s happy with it, but it goes for a recalibration to make sure it’s absolutely in spec. And then if something is found during that test, we’re obliged to fix it to make sure it’s good. But that means that the pilot doesn’t have it when they need it.”

BAE Systems look to remove the recalibration cycle for the newer helmet by using modern digital electronics and digital sensors. This eliminates the need for scheduled maintenance requirements – a huge advantage for an operational squadron.

As part of the development of Striker II, a lot of time

▼ A head on view of Striker II showing the NVC at the top of the HMD’s visor



▲ A 41 Squadron RAF Eurofighter Typhoon seen low level, the pilot wearing the Striker I helmet
Joe Campion

has been taken to collect repair information across the 1,000 plus striker I helmets in the field. Kidd said: "We've been able to really target the areas of design for the new helmet to make sure that those failures and issues we see go wrong more regularly are designed out. So, we have designed out 80% of the failure modes that we've seen with the older Striker I system."

When it comes to the front line and at operational bases, these checks are carried out with deployed equipment. For Striker I large racks of equipment and calibration benches are required to perform the checks. Nigel said: "For Striker II, we're developing a ready room device which is smaller than a briefcase, making it much easier to transport."

Advantages

With all these new technologies and advancements comes many more advantages. Like Striker I, via using the high-resolution sensor systems in Striker II, the pilot can see through the shell of the aircraft with a 40° binocular field of view, In addition to the optical tracking, Striker II introduces inertial tracking resulting in hybrid opto-inertial head tracking system. Compared to Striker I, this enables the head to be tracked over a wider head motion range. For example, if a pilot is in a dogfight scenario and must look over a shoulder to determine where the adversary is, the inertial tracking takes over seamlessly. This gives the benefit of getting the zero-latency head tracking and the ability to see the full 40° symbology in a very crucial 'eyes and head out' situation during a high stakes manoeuvre. Importantly this is achieved without the need to install additional tracker sensors facing the pilot, saving space in the cockpit. So in essence Striker II retains the battle proven head tracking from Striker I, with added benefits of increased situational awareness.

Another advantage the Striker II brings is colour symbology. Previous HMDs, such as Striker I, the F-35 Gen III helmet and JHMCS, all display information in monochrome green. Striker II's game changing coloured symbology lowers cognitive workload for the pilot and significantly decreases decision making time. A simple and effective example is in a combat environment, if a pilot can see friendlies in blue and enemies in red, they instantly know who to take out, and where seconds can be critical, this is a massive advantage.

The Striker II's colour display can also support picture in picture technology. This is where the pilot can see a small offset window separate to the main display. The window is large enough to digest the information but will not distract the pilot from essential flight data. The window could also host a livestream provided by an airborne UAV or a forward controller on the ground via datalink to give the pilot more situational awareness of the mission, again leading to reduced workload and time of execution.

A unique selling point of Striker II is that it functions as a 24/7 HMD thanks to the integrated night vision camera located in its central forefront. This wipes out the requirement for night vision goggles (NVGs) which can add weight and be uncomfortable in high G manoeuvres. The NVC provides a real-time image over the visor. More impressively, when wearing Striker II, the colour advantage is not lost when day turns to night as it can display coloured symbology. This displays information in an intuitive way to the pilot, as opposed to overloading them with information and adding to the challenge of an already highly stressful environment.

Kidd added: "With NVGs you've got the structure, the mounting brackets and more. With Striker, you don't have any of that. So, although it's the same field of view as a NVG, it feels a lot bigger because you haven't got all the structure and the rings blocking out your natural field of view; you've got all your periphery of the field of view, as well the information on your visor, so, it's very powerful."

Striker II has the capability to provide the pilot with 360° directional audio. The pilot would be able to tailor the technology for example, having ground forces' radio sound like it is generating from beneath the aircraft and friendly aircraft in the formation sound like it is coming from above.

Development

When asked what has been done so far on the development of Striker II, Kidd explained the de-risk tests that have been completed. These include high speed wind blast, which simulates the forces seen on the helmet during ejection, helmet impact testing, flammability testing, and more. This testing, which was performed last year, has been described by Kidd as successful. "We have also gone through several customer reviews of the design now, which has baselined the capability and the basics of the design." Striker II also has gone through de-risk flying from January to April this year. These flight trials were performed by BAE Systems test pilots and RAF Test

▼ Striker II is the first HMD to provide colour symbology in a night-time mission scenario

And Evaluation Squadron, 41 Squadron. Kidd also stated that these were very successful. "We wanted to make sure our customer has confidence in the new capabilities that we are providing with Striker II. We have now built up enough evidence to move forward to what is the formal qualification set of activities."

The flight trials saw Striker II being put through day and night missions such as formation flying, air to air manoeuvres both within visual range and beyond visual range, air to air refuelling and close air support integration with JTACS on the ground.

What is next?

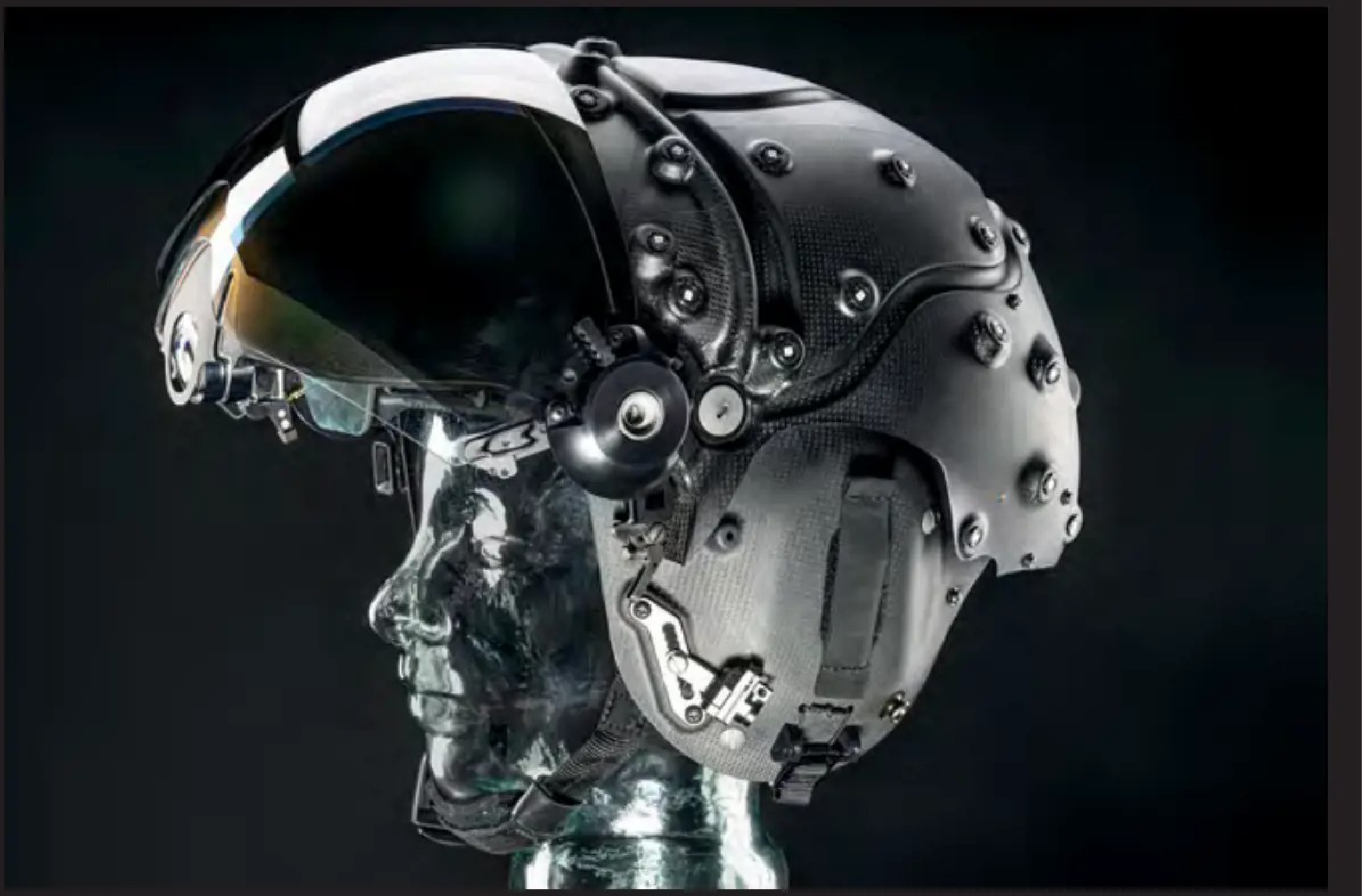
Now the initial flight trials are complete, the helmet design is being fine-tuned. Kidd explained: "What we're doing right now is finalising the final design ready for production. We are getting ready to manufacture quite a significant number of assets that we are going to be putting through all of the functional tests, and all of the physical safety tests."

BAE Systems is aiming to do the main qualification activity through 2026, aiming to have the initial production units in use by 41 Squadron in 2027. They plan to begin full production the same year, with wider adoption in 2028.

Striker II is primarily being developed for use on the Eurofighter Typhoon but when Aviation News asked about the HMD being operated by Gripen pilots in the future, Kidd replied: "Gripen has Striker I in operation now, and obviously we're continuing support for that. What I would say is that Striker II has been architected to be easily adaptable into different aircraft. So obviously our Typhoon contract is our focus, but we are talking to a range of different people who have an interest in this capability going forward."

In terms of other areas of military aviation, such as in training and tactical airlift into combat environments, Kidd stated: "Our focus today, and the way in which we've driven the technology, is absolutely the kind of fast jet, high G, kind of environment that doesn't preclude this type of system being used on some other aircraft and some slow-moving aircraft. We are aware of there being aspirations in various nations to have this type of capability available on transports, tankers, and training aircraft as well. We are looking at versions of the Striker technology that could support that."

Striker II can simply be described as ahead of its time. The advantages it will bring to the battlefield are unmatched; no other HMD can provide colour displays both day and night, optional 3D audio and an aim of having zero downtime when it comes to maintenance. What was a goal of BAE Systems to be able to integrate the Striker II into today's version of the Eurofighter Typhoon but also be compatible with future variants and even the future Global Combat Air Programme seems to be becoming a reality. Kidd concluded: "Customers are happy that we've got the right sweet spot there in terms of the key things: the display, field of view, the accuracy, the brightness, the colour range, the accuracy of the tracking, the lack of latency in the system, the way the night vision camera performs. Given the constraints of available technology today, we think we've effectively got perfection." AN



▲ A side profile of Striker II HMD

▼ BAE Systems test pilots start up a twin seat Eurofighter during de-risk flight trials of Striker II

TIME WILL TELL

The Airbus A350-1000 is a perfect replacement for the Boeing 777-300ER, but while the widebody has got its size right, its timing might be slightly off. **Martin Needham** considers the XWB's future

Virgin
G-VLUX

Almost 20 years since Airbus relaunched the A350 Xtra Wide Body (XWB) at the 2006 Farnborough International Airshow, it's evident the twin-aisle type has been a roaring success for the European aerospace giant.

In amassing 1,381 orders, the A350 hasn't just offered a convenient model for A340 operators wanting to move away from long-in-the-tooth quadjets to something much more economical, efficient and up to date. Indeed, it's even turned the heads of ardent Boeing 777 operators such as Delta Air Lines, Singapore Airlines and Japan Airlines – the last of these having never previously accepted a factory-fresh Airbus jet until its maiden A350-900 in June 2019.

But while the XWB is proving to be a huge sales success, the type's two variants haven't performed equally well. The smaller -900 variant has surged ahead in sales, having just slipped into quadruple digits by registering 1,001 firm orders. The disparity has become so stark that, even with China Airlines signing up for ten A350-1000s at the end of March and Eva Air signing for six in April, the stretched variant still doesn't account for a quarter of all A350s sold. It's become an unfortunate trend for Airbus, but is unlikely to be giving their sales team many headaches just yet.

Future relevance

That's because the A350-1000 is an aircraft for which relevance is waiting in the wings, and it's all down to Boeing. The US airframer completed its 833rd and final 777-300ER in early 2020 and finally placed it with a carrier – as ET-BBG (c/n 65420) with Ethiopian Airlines – in December 2024, after China Southern Airlines refused to take the jet at the start of the COVID-19 pandemic. The handover marked the end of a two-decade run which began with Air France receiving F-GSQA (c/n 32723) and concluded with the -300ER having firmly established itself as the most popular variant of the widebody twin. However, the end of first-generation 777 production now means Boeing has nothing to offer airlines wanting to replace ageing 777-300ERs. Well not until 2028 at the very earliest, with the Arlington, Virginia-based company needing to tend to more urgent issues, among them ongoing challenges with 777-9 certification, quality control and delivery backlogs before turning its attention to the smaller 777-8. The -8 model is intended as a like-for-like replacement for the -300ER, but it too has suffered a similar dearth of orders, chalking up just 43 from only two customers: Emirates (35) and Etihad Airways (8).

The sluggish sales performance of both the A350-1000 and 777-8 can be attributed to the average age of a 777-300ER, currently at 12.85 years. At

▼ At the 2024 Farnborough International Airshow, Virgin Atlantic seemingly trimmed its commitment with Airbus for two more A350-1000s and instead increased its order for A330-900s. Tim O'Grady

virgin atlantic
AIRBUS A350-1000

this point, an aircraft will likely have had two heavy maintenance visits or 'D checks', with another likely due within the next three-five years. Due to the massive investment of time, money and man hours in such an undertaking, the third 'D check' is often the last and most costly to be undertaken by an airline which took delivery of a new aircraft direct from the manufacturer.

Singapore Airlines (SIA) is one such carrier. Its 777-300ERs are closing in on their third D checks, while it also plans to roll out brand-new first class and business class products – which had been earmarked to debut on its still yet to be delivered 777-9s – across its A350-900s from early in the new year. As the world's biggest A350 operator, it would seem likely that SIA will commit to the larger variant, but it remains to be seen whether a move to replace its 22 777-300ERs will come sooner rather than later. The airline will be mindful of their advancing ages and looming heavy checks, which may prompt action, especially as there is a five to six year delivery backlog for the XWB, primarily due to supply chain issues at Spirit AeroSystems, which are preventing Airbus from increasing production beyond the current six aircraft per month.

▲ Qatar Airways flies 24 A350-1000s, with a further 18 on order, bringing its tally to 42 jets Lee Spencer

◀ Japan Airlines accepted its first A350-1041, JA01WJ (c/n 610), on December 11, 2023. Here is JA06WJ on final approach Tim O'Grady

Trumped by tariffs?

Donald Trump's second term as US President has been dominated by talk of tariffs and trade wars, with China the most heavily penalised by the administration. Chinese Premier Xi Jinping has responded forcefully, including instructing the nation's airlines to halt their acceptance of Boeing-

▼ Ethiopian Airlines became the first African customer forf the A350-1000. They currently operate a fleet of four of the -1000 variant. Tim O'Grady

The British Airways A350-1000, G-XWBG, rotates from Manchester Airport following a diversion. Lee Spencer

In April, Rolls-Royce received EASA approval for its Trent XWB-84 Enhanced Performance (EP) engine. AIRBUS/H GOUSSE/MASTER FILMS

built airliners. Shanghai-based Juneyao Airlines has already refused to take delivery of a 787-9 Dreamliner, B-226N (c/n 65433), while XiamenAir and Air China have both returned 737 MAX 8 jets which were being prepared for delivery to the two carriers at the Boeing 737 Completion and Delivery Center at Zhoushan, a joint venture between the Commercial Aircraft Corporation of China (COMAC) and the US airframer. The two aircraft destined to have joined XiamenAir – N242BE (c/n 64677) and N230BE (c/n 64680), which were due to be assigned B-20CQ and B-20DX, respectively – were ferried from Zhoushan to Seattle/Boeing Field via Guam and Honolulu between April 22-24 and April 18-19, respectively. Similarly, Air China refused another MAX 8, N248BE (c/n 60938), the future B-225P, which was returned to Boeing Field between April 18-19.

We are still well within the first six months of Trump's second term, but there is no indication that the tariffs his administration has imposed on China will be removed any time soon. While this doesn't immediately appear to play into the hands of Airbus and the A350-1000, it should be noted that four Chinese carriers operate the smaller -900 series XWB. And of those four – Air China, China Eastern Airlines, China Southern Airlines and Sichuan Airlines – the first three listed also operate the 777-300ER.

If the tariffs remain in place, the A350-1000 becomes ever more appealing – a right-sized, like-for-like replacement for the 777-300ER that won't come saddled with an eye-watering array of Trump-induced taxes.

Enhanced engine

If there wasn't enough of an uphill struggle for the 777-8, Rolls-Royce has been working hard to improve what could be considered the weak link in the A350's armour. While the Trent XWB-97 boasts

After recently receiving its first A350-900s (pictured), Emirates president Sir Tim Clark has already stated that the A350-1000 is of interest Kyle Mckinlay

BRITISH AIRWAYS
G-XWBP

▲ British Airways' first A350-1000 arrived in July 2019 and the 18th and last example was delivered in February 2024 Tim O'Grady

the highest bypass ratio in its class and the highest ever bypass ratio for a turbofan engine, it has also struggled with reliability. In making the engine as economical, compact and cost-efficient as possible, the manufacturer had to make the powerplant's core run hot – in excess of 1,000°C. This isn't a problem except at airports, where the ingestion of sand is a regular occurrence as particles can turn into molten glass deposits and get stuck to components deep within the engine. This can hinder the Trent XWB's cooling systems, reduce efficiency and cut the amount of time between maintenance checks.

However, in April, the Derby-based company received European Union Aviation Safety Agency (EASA) approval for its Trent XWB-84 Enhanced Performance (EP) engine. While set to power the A350-900, the XWB-84 EP incorporates design improvements, including upgraded fan, compressor and turbine aerodynamics and enhanced turbine blade cooling, as well as offering a 1% improvement in fuel consumption. A similar package is planned for the larger XWB-97 which will provide airlines with a reduction in overall operating costs and emissions, in addition to remedying the aforementioned sand/glass particulate issue.

It's a development that hasn't gone unnoticed. Emirates president Sir Tim Clark has already stated that the A350-1000 is of interest, telling *Aviation Week* in March: "We have done a lot of work in defining what the aircraft is going to look like inside and which kind of mission we are putting it on." Indeed, the -1000 is capable of flying to almost anywhere on Earth non-stop from its Dubai hub,

QANTAS
AIRBUS
A350-1000
#LongRangeLeader

▶ Airbus has already pushed the boundaries of the A350's performance by offering an ultra-long-range (ULR) version of the A350-1000 to Qantas AIRBUS/QANTAS/JAMES D MORGAN

EVA AIR
EVA AIR

▼ Eva Air placed an order for six A350-1000s and three A321neos in April this year Airbus

CHINA AIRLINES

▲ In March, China Airlines placed an order for ten A350-1000s. The -1000 variant will fly routes to North America and Europe
Airbus

including Los Angeles and Auckland, according to a graphic circulated by Airbus.

The manufacturer has already pushed the boundaries of the A350's performance by offering an ultra-long-range (ULR) version of the A350-1000 to Qantas as part of the Aussie carrier's Project Sunrise effort to connect Sydney with New York and London non-stop. Philippine Airlines is also understood to have signed up for the ULR variant in May 2023, while the niche type may also be of interest to Air New Zealand, which has a renewed interest in flying to London. Its oldest 777-300ERs are more than 14 years old, while the ten-strong fleet have an average age of 13.2 years.

Repeat business?

The A350-1000's right size and time credentials as a successor to the 777-300ER, coupled with continuous improvements both in terms of reliability and efficiency, will be enough to turn heads without trade wars rumbling on in the background.

virgin atlantic

▼ Virgin Atlantic's G-VELJ touches down at Manchester Airport. The airline use the type to fly to Atlanta, Las Vegas, New York and Orlando
Lee Spencer

Both Qatar Airways and Etihad Airways have already received examples of the larger A350 variant, flying 24 and six, respectively. The former currently has a further 18 on order, which will bring its tally to 42 jets. However, it also fields 57 Boeing 777-300ERs that will require replacement in the coming years, albeit not urgently as the sub-fleet has an average age of 12 years. Similarly, Etihad has nine -300ERs in its fleet and although they are to be superseded by the 14 A350-1000s the carrier has on order, there is potential for a supplementary order for additional widebodies from either airline.

Kuwait Airways could follow suit. Its most recent fleet renewal programme has involved a shift towards an all-Airbus line-up of A320neo and A330neo Family jets and A350-900s. Its ten 777-300ERs are among the youngest placed with a legacy carrier at just 8.1 years, but when they come to be replaced there seems to be a clear indication of the carrier's direction of transactional travel.

Further east, a similar scenario faces Cathay Pacific. It ordered 18 A350-1000s in September 2010 and has a further 52 777s – split between 17 -300s and 35 -300ERs – in its fleet. Thai Airways could also centralise its long-haul fleet on the XWB by adding the -1000 version to its 23 -900s as a successor to its now-withdrawn A340-500/600s and A380s, as well as its 777s.

No matter how many carriers may come to order the A350-1000, it remains a waiting game for the European aerospace giant as 777-300ERs grow longer in the tooth and become ripe for replacement and retirement. With Rolls-Royce working on improving powerplant performance and reliability, and Emirates poised to give the type a major endorsement, there are likely to be a raft of carriers seriously considering acquiring the type. Should the Trump administration's attitude toward tariffs remain firm, that number could grow considerably, especially if the trembles and tremors of this ongoing trade war continue to unsettle the commercial aircraft purchasing landscape.

THE TIP OF THE TACTICAL SWORD

Aviation News speaks to those on Portugal's flight line, operating the F-16 Fighting Falcon, as they sharpen their skills to remain mission ready

The Portuguese Air Force (FAP) has two flight line Lockheed Martin F-16AM/BM (MLU) Fighting Falcon Units stationed at Monte Real AB (AB05) – Esquadra 201 'Falcões' and Esquadra 301 'Jaguares'. They may have different historical backgrounds, which link to the origins of the FAP but today they have the same mission: to execute counter-air and attack operations.

Portugal received the F-16 in two batches. In 1994 under the Peace Atlantis I programme, a total of 20 F-16s were delivered to Portugal; 17 F-16A-15 OCU, and three F-16B-15 OCU Fighting Falcons. These jets remained in service until 2011, with the 16 (one of the 17 was lost in a crash in 2002) F-16A OCUs been upgraded to F-16AM standard under the Mid Life Upgrade (MLU) program, 15 having been completed by November 2011 and the 16th example redelivered by January 2012. The three F-16Bs of this batch also underwent the MLU between 2011 and 2013.

The second batch of 25 ex-USAF F-16 Block 15 aircraft arrived in 1999 under the Peace Atlantis II program, 21 F-16A Block 15 and four F-16B models. None of those aircraft entered service with the FAP in the Block 15 variant. During this delivery, Portugal decided to upgrade its fleet via the MLU of the F-16. The decision for the upgrade was driven by the fact that the original F-16 Block 15 was already outdated, while the MLU was a true fourth generation fighter, which allowed the FAP to be a credible air force among NATO allies. The upgrade of Portugal's F-16s commenced when 19 of the 21 jets delivered during the second batch underwent the MLU, while they retained two as a source of spares. The MLU took up until 2003 to get the first F-16 (MLU) airborne, and it finally entered service in November 2005 with Esq301. Since the beginning of the upgrade, from time-to-time Portugal sent a few pilots to the national pilot test school in the USA. Those pilots are responsible for the MLU programme upgrades and bringing tactics back to the squadrons.

Sales to Romania

In the spring of 2021, an eight-year program concluded when the last of 17 ex-Portuguese Air Force F-16s sold to Romania, which landed at Borcea Air Base. The procurement began in 2013 when the

▲ Portugal received the F-16 in two batches. In 1994 under the Peace Atlantis I programme, a total of 20 F-16s were delivered to Portugal – 17 F-16A-15 OCU, and three F-16B-15 OCU Fighting Falcons All images Aviation News

▲ A pilot gets ready for a training mission above the airbase

Romanian Air Force ordered 12 F-16 Block 15 MLU fighters (nine single-seat F-16AMs and three two-seater F-16BMs) from Portugal worth roughly €628m. In 2019, a second order followed for five F-16s; four single-seaters and one two-seater.

Mission

To be mission successful, both squadrons are focused on mission effectiveness, have an agile mindset and continuous improvement posture, and work as part of a wider highly skilled team at Base Aérea No 5, Monte Real.

Both units hold the same responsibilities which are both offensive and defensive. Offensive Counter-Air (OCA) consists of offensive operations to destroy, disrupt, or degrade adversary air and missile capabilities. Ideally, most OCA operations will prevent the launch of aircraft and missiles by destroying them and their supporting infrastructure and systems on the surface or failing that, as close to their source as possible.

Defensive Counter-Air (DCA) consists of all active and passive air defence operations to detect, identify, intercept, and destroy or negate adversary air and missile forces attempting to attack or penetrate friendly battlespace, or to nullify or reduce the effectiveness of such attacks should they escape destruction.

These types of missions do not include Close Air Support (CAS), Anti-Surface Warfare (ASuW), and Anti-Submarine Warfare (ASW) missions, and make up 40% of both units' missions in the Continuation Training program (CT).

Air Interdiction – air operations conducted to divert, disrupt, delay, degrade or destroy an adversary's military potential before it can be brought to bear effectively and at such distance that detailed integration of each air mission with the fire and manoeuvre of friendly forces – is normally not required. Every mission, independently of the target, starts with a Commander's Intent analysis, followed by a thorough target study, an extensive review of the rules of engagement, intelligence update, threat examination, and own capabilities available. With all this information, the Flight Lead will organise a Flight Brief where all airmen are present.

▼ The F-16AM plays the Quick Reaction Alert (QRA) role out of Monte Real AB. This one is taking off with live weapons on a tango/training scramble

ASuW operations are part of the Airpower Contribution to Counter-Maritime Operations (APCMO). They are conducted to destroy or neutralise adversary naval surface forces. These missions can be performed with the same weapons that are used for conventional air-to-ground attacks or with specific armament that Portugal currently does not have.

CAS is an air action against hostile targets which are near friendly ground forces, and which requires detailed integration of each air mission with the fire and movement of those forces for fratricide avoidance and targeting guidance performed by a certified and qualified Forward Air Controller (FAC). CAS missions may or may not have a complex preparation before the flight, as they can be requested with great urgency to support ground troops; in the latter case, the communication between pilots and FACs is crucial for mission success.

Viper Sword

Portugal regularly performs exercises to stay at the tip of the tactical sword when it comes to mission disciplines. One such exercise is Viper Sword, the latest edition of which took place with Belgian F-16 Fighting Falcons.

The Belgian Air Force (BAF) and the FAP F-16 community operate with the same tactics, techniques and procedures making it very easy to work together, whether in different formations or having pilots from both nations on the same formation.

During the exercise, many types of missions were executed, including OCA, AI, CAS, Suppression of Enemy Air Defences (SEAD) and Destruction of Enemy Air Defences (DEAD), both day and night. The fighters also executed DCA missions. Focusing on the CAS Mission, both preplanned and immediate CAS were practiced (immediate CAS is like a quick reaction alert (QRA) mission).

When executing a pre-planned CAS, the pilot knows where and how the mission will occur, has time to plan and co-ordinate the mission in detail, and can select the weapons to match the expected targets. When this happens, pilots follow a standard timeline and take-off to reach the target area at the expected time.

When performing a QRA CAS, the pilot does not know where the CAS will occur and has no time to plan or co-ordinate the mission. In this case, the jets are already loaded with a payload that allows an 80% solution to face any possible target. When this happens, the QRA is activated, pilots take-off to the target area or the location they receive and start executing the mission when in contact with the Joint Terminal Attack Controller (JTAC). Viper Sword takes place in a large military area, all firing runs are 'dry' and not with live ordnance. This happens to maximise the experience gained by flying in a contested environment.

That contested environment is appropriate to the mission scenario, typically a large airspace, with opposing forces' airbases and defences. The friendly forces usually have the mission to fly over enemy territory and strike pre-planned or dynamic targets. With that in mind and to increase precision, the simulated weapons used are usually either GPS or laser guided.

▲ The FAP operate the F-16AM/BM in numerous mission disciplines, such as CAS, SEAD, DEAD and DCA

▼ Two FAP F-16AM's in the QRA configuration taxi back into the home base QRA hangars

▲ Monte Real AB has its training aerospace directly above the airfield, allowing more training time in the air for the F-16s

In terms of what the Portuguese squadron has gained from the Belgians' presence, an FAP F-16 pilot said: “We have worked with the Belgian F-16s for many years, and we always learned from their experience and expertise. I like to believe that the feeling is mutual. We hope to continue developing our partnership for as long as possible.”

When asked about what goes through the mind of an F-16 pilot during such exercises and practicing for air to ground scenarios working with JTAC, he responded: “Air-to-ground missions are always challenging, especially when it is executed in a multi-role aircraft. In a more complex scenario, when the F-16 needs to fight his way into enemy territory, the Air-to-Ground part is usually the most critical point of the mission since all that has just happened was to ensure air-to-ground weapons hit the target.”

From being an air-to-air fighter to being a multi-role jet, the F-16 has adapted well to the realm of precision weapons employment and now plays a role in air-to-ground and in providing ground forces support. This is dependent on configuration, payload, air-to-air refuelling capability and target location in relation to the home base. The pilot said: “Typically, I would say the F-16 can be on station between 30 and 60 minutes.”

Describing a CAS Mission, he said: “Usually we contact the JTAC when we are still away from the target area and report our location and playtime. Then we receive a situation update from the JTAC and the gameplan to follow. We can then receive the location of a possible target via different types of means and we report what we see on the target location. Once we have the target identified and confirmed with the JTAC, we perform our air-to-ground checks prior to weapon employment, and we receive clearance from the JTAC. After that, we execute the guidance of the weapon and we – or the JTAC – perform a battle damage assessment on the target to confirm it was destroyed or that it needs a re-attack.”

Aviation News asked: “What is your mindset over the range?” He responded: “I strive to keep my focus at a maximum level in any situation but knowing that a JTAC is near the place where weapons will be employed motivates me to do my best.”

When asked how training differentiates from the ‘real deal’, he stated: “Training, no matter how realistic, will never compare to operational theatre regarding safety, control and stress.

“In training, we do our best to simulate or replicate the conditions of an operational theatre, especially in exercises such as Viper Sword. We focus on replicating an operational environment's challenges and stress so we can provide aircrews the most realistic experience but ultimately it is a controlled environment that has safety as a paramount.

“In an operational environment, the execution of the mission can be very similar as it is in training but the knowledge that it is no longer a controlled environment will always lead to extreme stress and emotional pressure.”

Portugal and its F-16 fleet will continue to provide a myriad of mission types when called upon. At the time of writing, Portugal had a detachment of F-16 fighters on NATO's Eastern Flank at Amari Air Base in Estonia. Four F-16s and roughly 90 personnel are on a four month Enhanced Air Policing mission, responsible for securing the airspace over the Baltic region. Between late May and early June, the four jets reportedly conducted approximately 20 intercepts of various Russian military aircraft. It's just one example of the type of mission the FAP F-16s and their personnel will carry out for their country and for its allies now and in years to come.

ARMAMENT AND SENSORS

Air to Ground

Currently, Portugal has a variety of air to ground ordnance that can be divided into two groups: General Purpose (GP) bombs, usually known as ‘dumb bombs’, which are not guided and rely solely on the ability and precision of the pilot to hit the target, and Precision Guided Munitions (PGM), which are assisted and guided in flight for greater target accuracy. 201 and 301 Squadrons have available MK 82, MK 84, and Strafe munitions as GP weapons and GBU-12 (Laser Guided), GBU-31 (GPS Guided), and GBU-49 (Dual Mode) as PGMs.

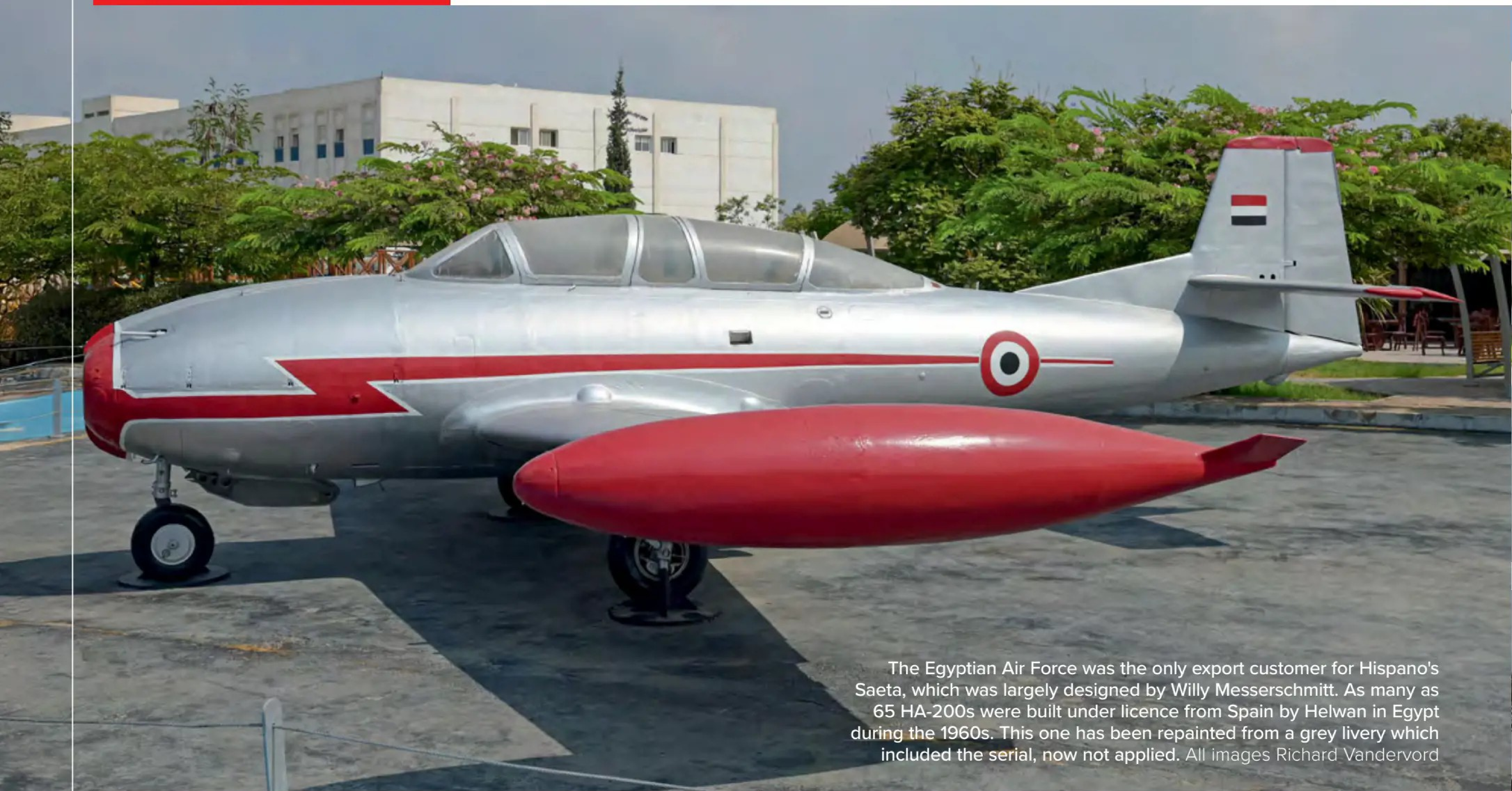
Air to Air

Portugal carries the AIM-120 AMRAAM and the AIM-9 Sidewinder on the wings of its F-16s. Live firing training of the AIM-9 takes place over the training areas west of Monte Real, and any combat-ready pilot within the two units can perform live-fire of the AIM-9.

Sensor

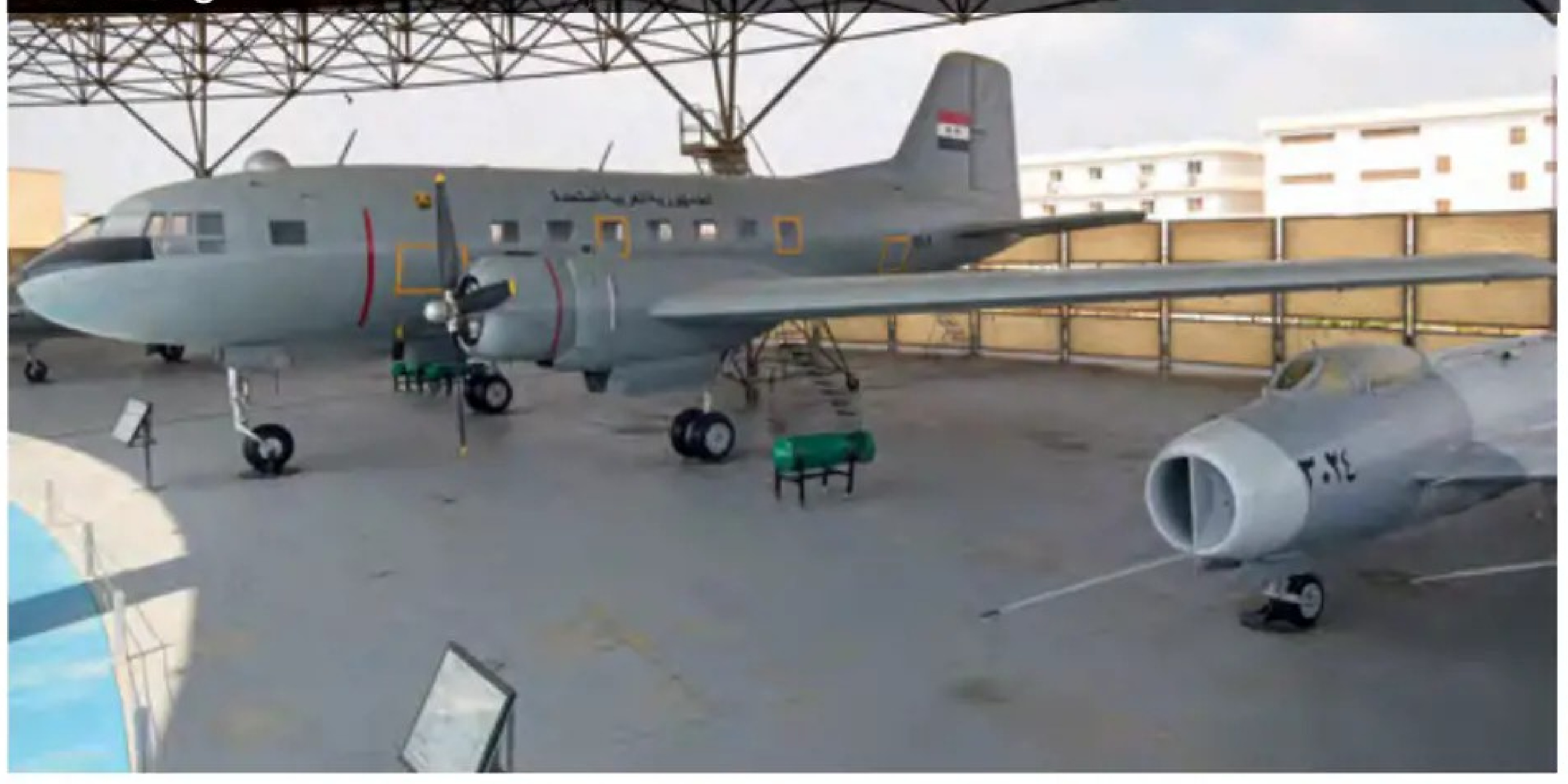
Portugal's F-16AM (MLU) is equipped with the G4 Litening Pod. A FAP F-16 pilot commented: “The G4 is a great pod, and we have noticed an increase in the capabilities against the previous Litening version.”

▼ Up close and personal above Portugal with one of the FAP's F-16AMs

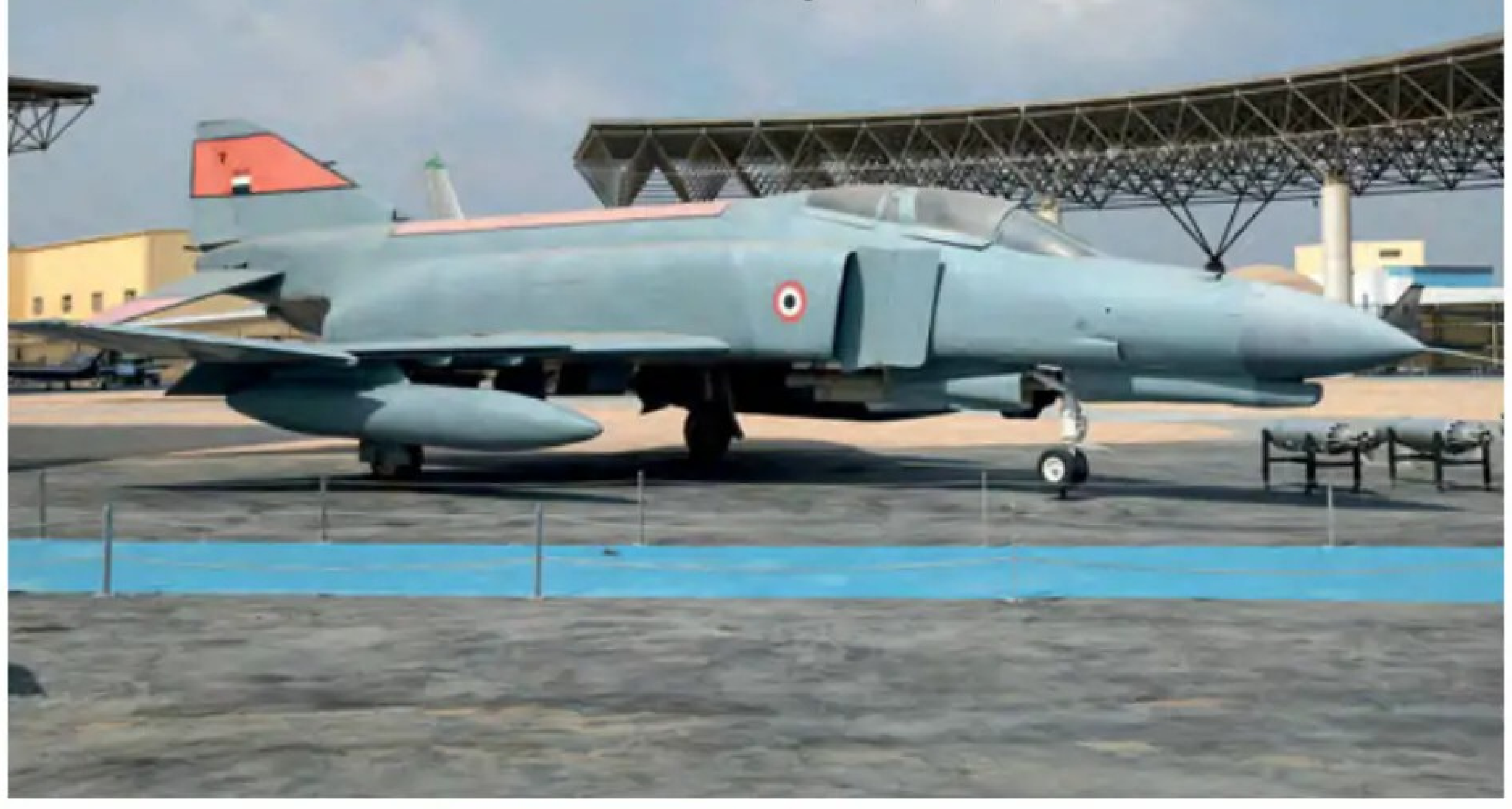


The Egyptian Air Force was the only export customer for Hispano's Saeta, which was largely designed by Willy Messerschmitt. As many as 65 HA-200s were built under licence from Spain by Helwan in Egypt during the 1960s. This one has been repainted from a grey livery which included the serial, now not applied. All images Richard Vandervord

Egypt operated a large number of Il-14s from 1955 onwards, up to as many as 70, the last serving until the early 1990s. This one is a star exhibit in the museum but is falsely marked as '1101', which was shot down by an Israeli Meteor NF.13 over the Mediterranean in October 1956 during the Suez Crisis. It is thought in fact to be 1105.

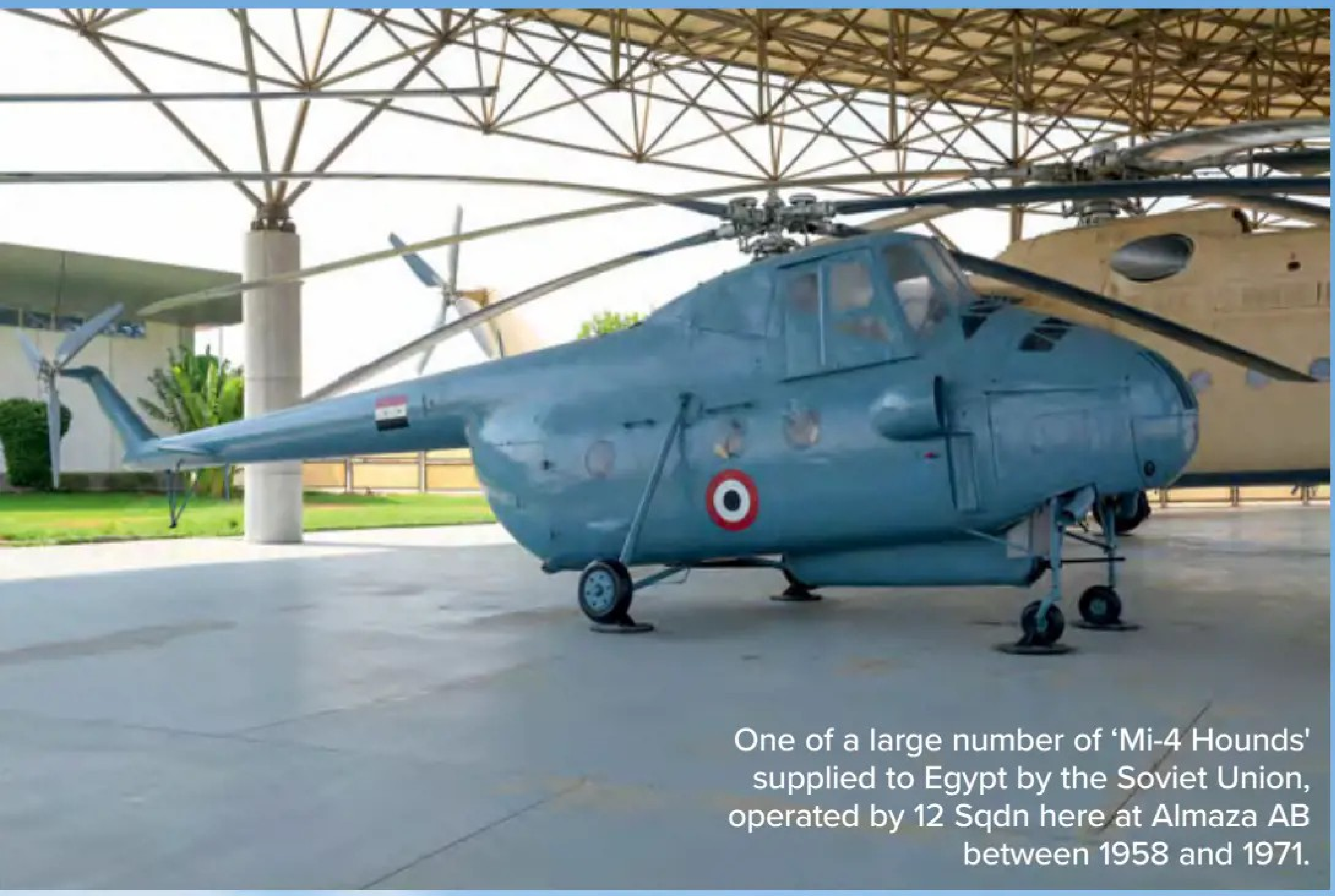


One of the 42 ex-USAF F-4Es obtained by Egypt from 1979. It took a long time for Egyptian personnel and crews to adapt to the complexities of the Phantom, having been accustomed to less sophisticated Soviet designs. This one has been used for Battle Damage Repair practice.

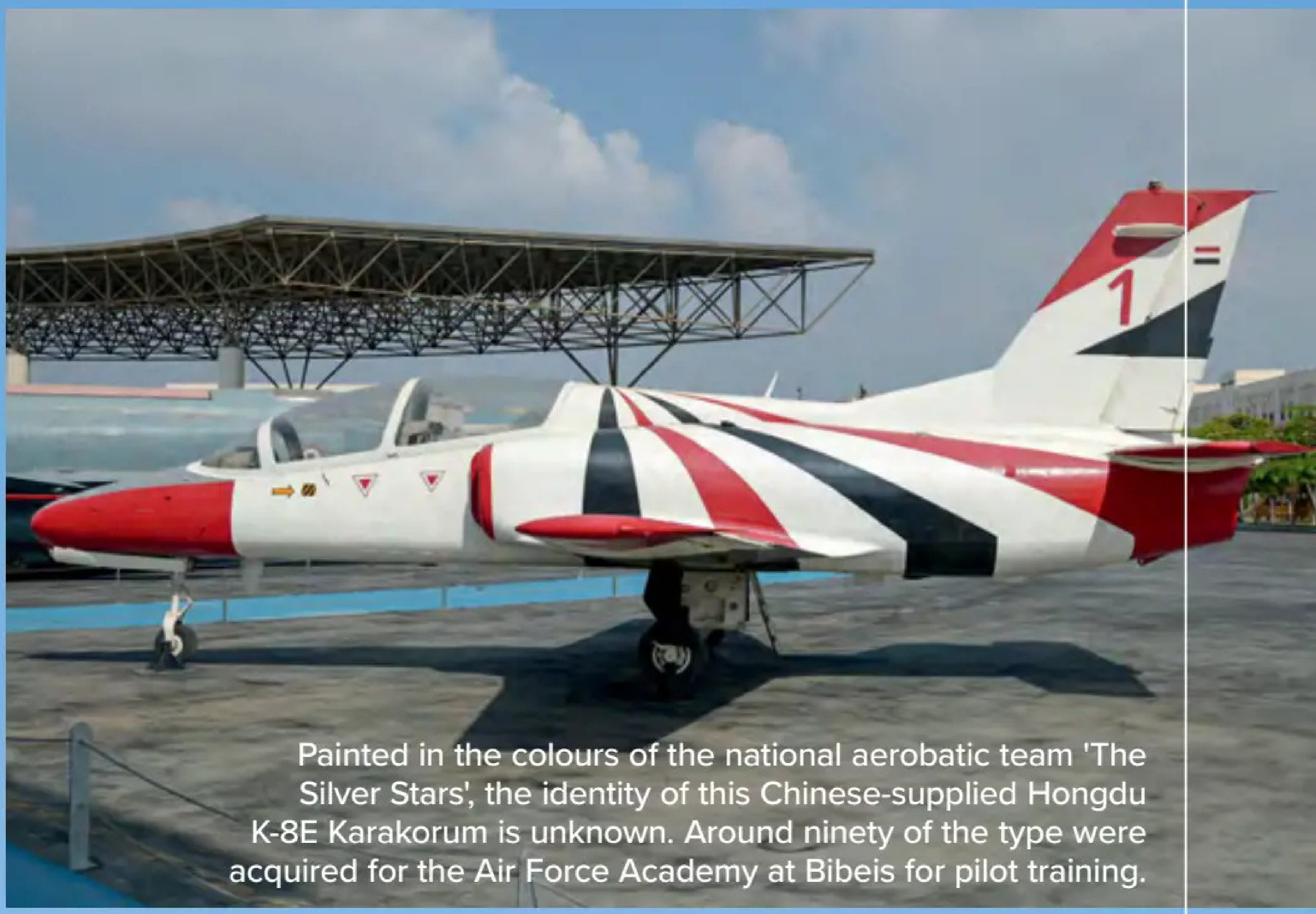


Egyptian Air Force Museum

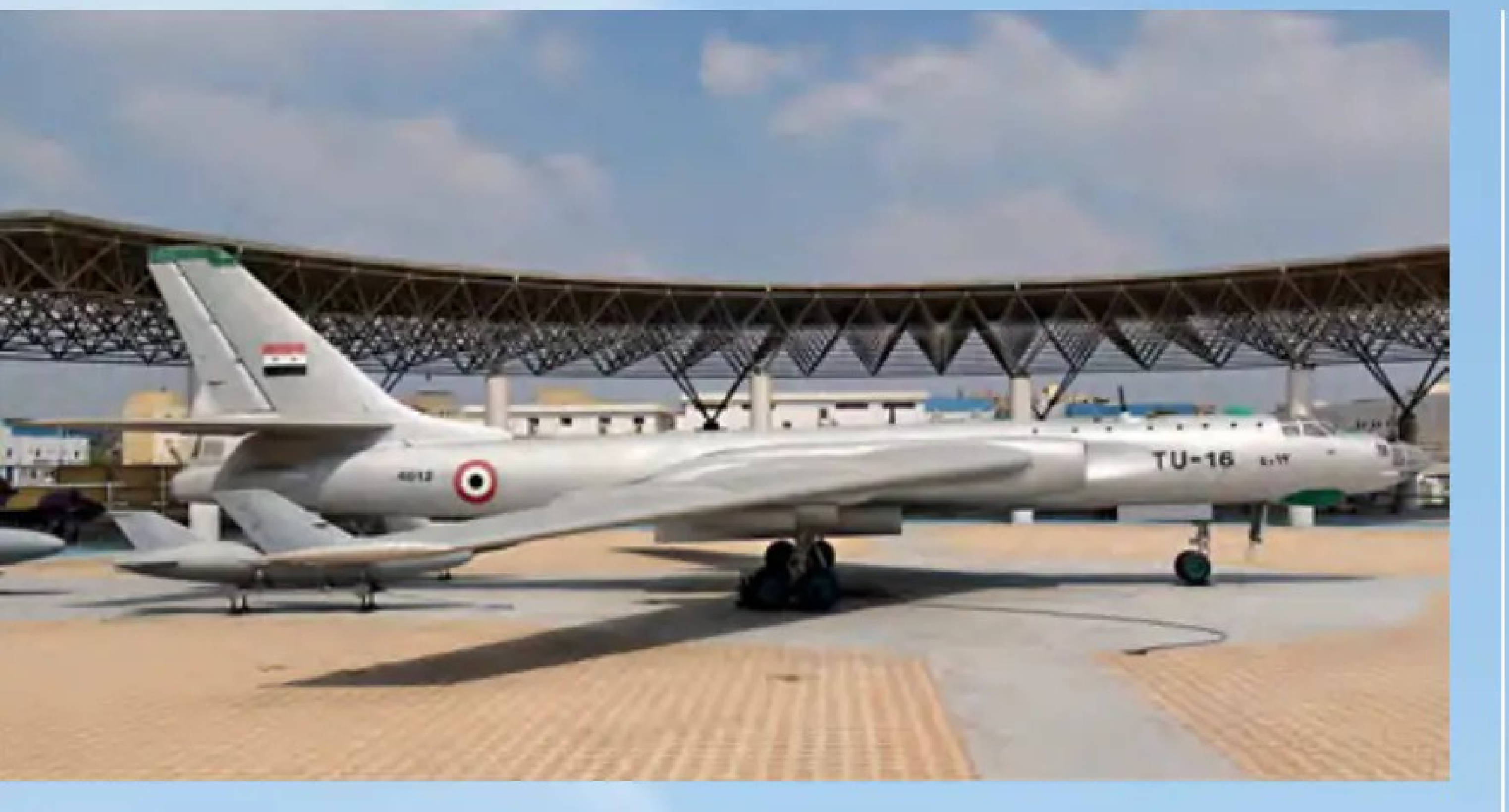
Richard Vandervord looks around the fascinating Egyptian Air Museum in Cairo and some of the magnificent machinery on display.



One of a large number of 'Mi-4 Hounds' supplied to Egypt by the Soviet Union, operated by 12 Sqdn here at Almaza AB between 1958 and 1971.



Painted in the colours of the national aerobatic team 'The Silver Stars', the identity of this Chinese-supplied Hongdu K-8E Karakorum is unknown. Around ninety of the type were acquired for the Air Force Academy at Bibeis for pilot training.



◀ At least 30 Tu-16s in various marks were acquired from 1962 and equipped three squadrons at Cairo West, Beni Suef and Aswan. Whole units were destroyed in the Six Day War in 1967 but measures were taken to limit losses the time of the Yom Kippur War in 1973. After relations with Moscow broke down, apparently Chinese Badger-copy H-6 bombers were also supplied. The last of the AS-1 Kennel air-to-surface missile equipped Tu-16K-11s and some of the H-6s may have soldiered on till 2000. Displayed here with a Radula cruise missile at rear, the "TU-16" labelling is a recent, unfortunate addition.

As long ago as 1910, the first airport in Africa was established on the site of what is now Almaza airbase, located immediately west of the current Cairo International Airport. Known as RAF Heliopolis prior to WW2, it was the home to most of the aircraft of the nascent Egyptian Army Air Service from its inauguration in 1932.

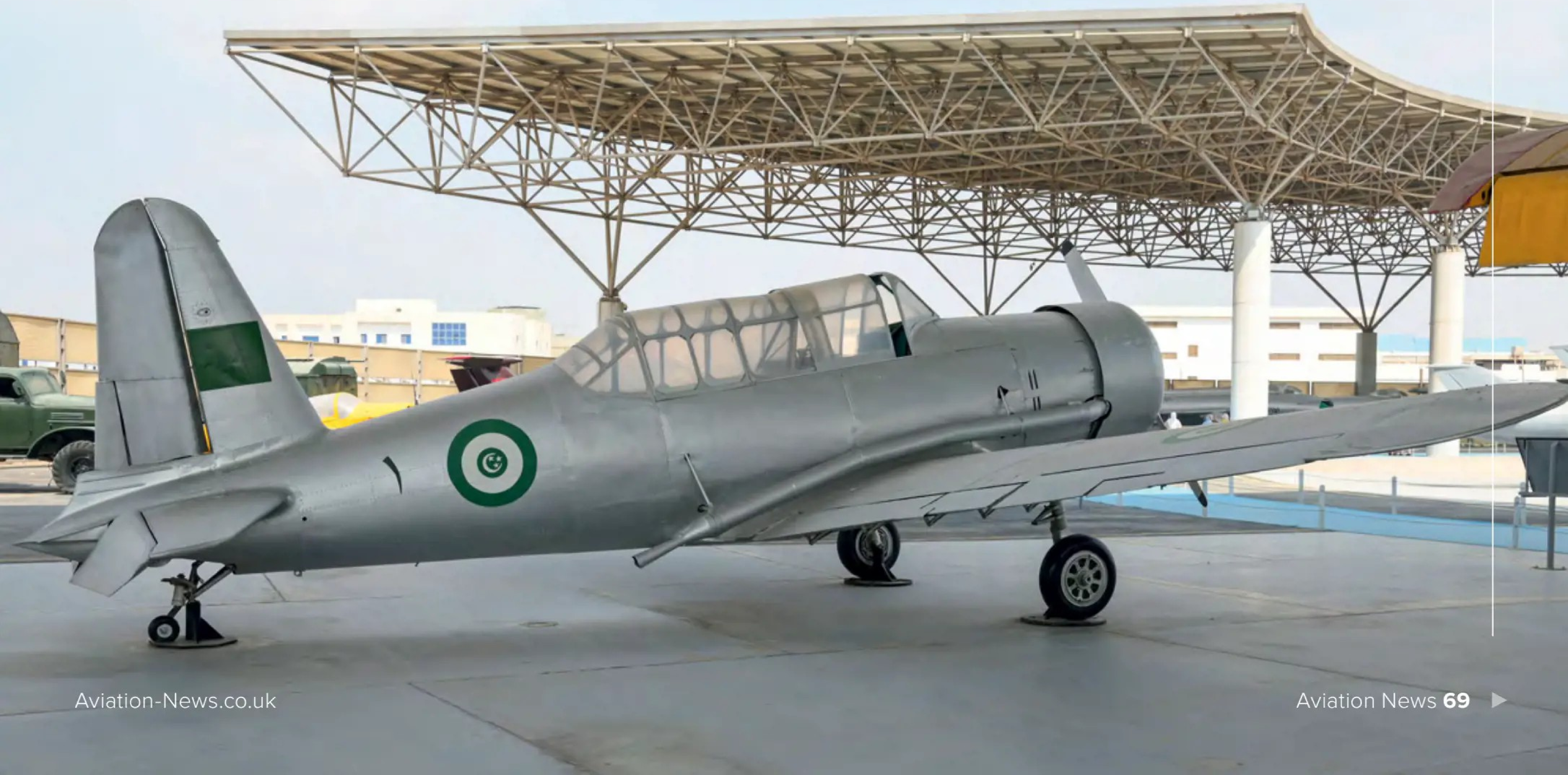
Today it remains active as a transport and helicopter base, the northwest corner also housing the Egyptian Air Force Museum.

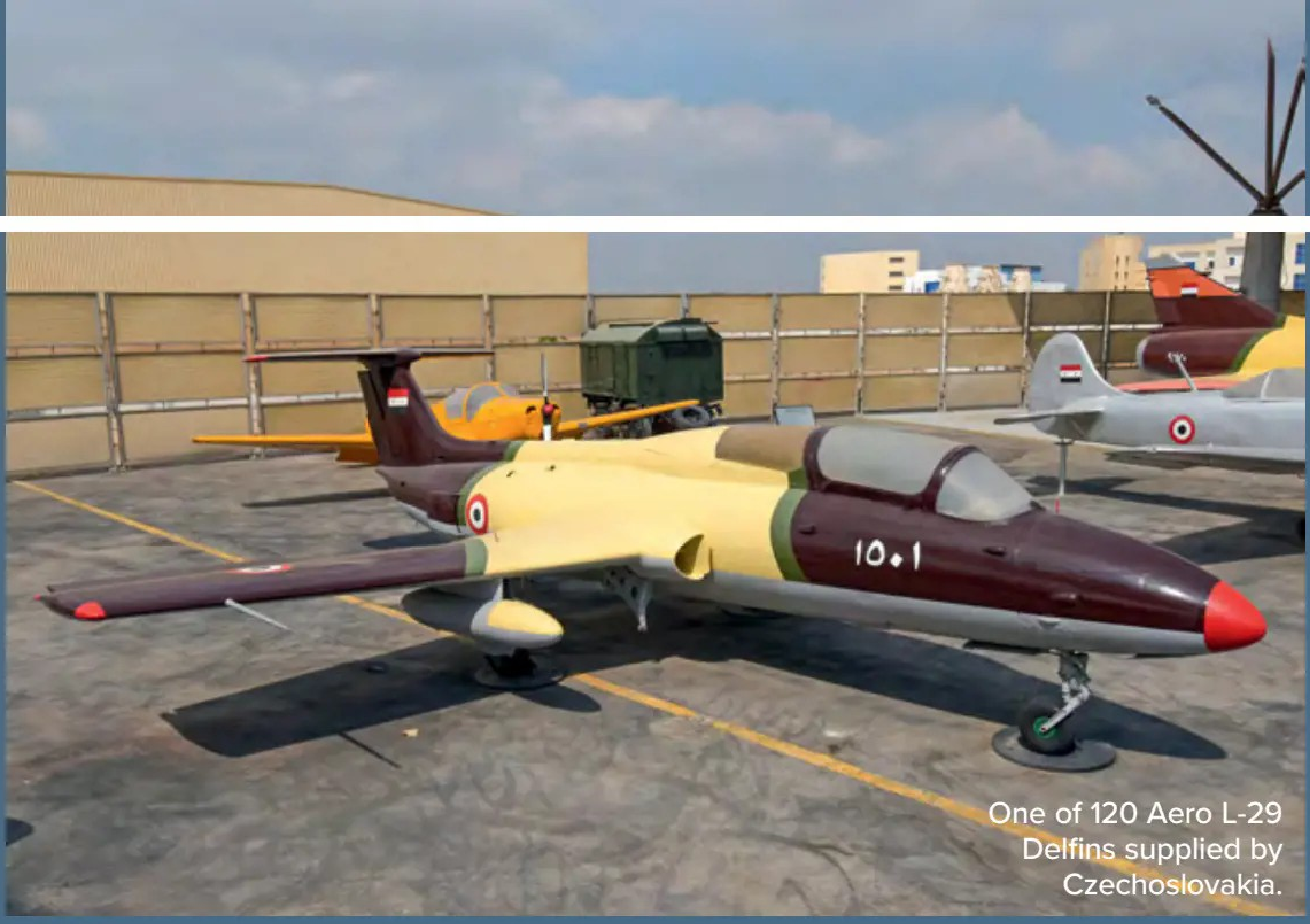
Since the end of World War II, the Egyptian Air Force has fought in the 1948 War of Israeli Independence, the 1956 Suez Canal conflict, the 1967 Six Day War and the subsequent war of attrition, the 1973 Yom Kippur/Ramadan War, and numerous border skirmishes, as well as in the conflicts elsewhere in the Middle East and Africa.

The EAF was almost entirely decimated in the 1967 war and relied heavily upon the Soviet Union for re-equipment until the 1980s when negotiations to order modern western types from the USA and France proved fruitful. Despite these procurements, Egypt turned to China for further strengthening of the air force, made available at relatively favourable cost.

The Egyptian Air Force Museum tells the story of the many conflicts in which it has been involved since 1932. An impressive array of aircraft from the post-WW2 era greets the visitor, mostly arranged in a large circle under a protective roof structure. Out in the open, the centerpiece of the collection is a Tu-16 'Badger' heavy bomber, gleaming in its silver finish.

▼ This Vultee BT-13A Valiant carries the old style Egyptian roundel used from 1945 to 1958.





One of 120 Aero L-29 Delfins supplied by Czechoslovakia.

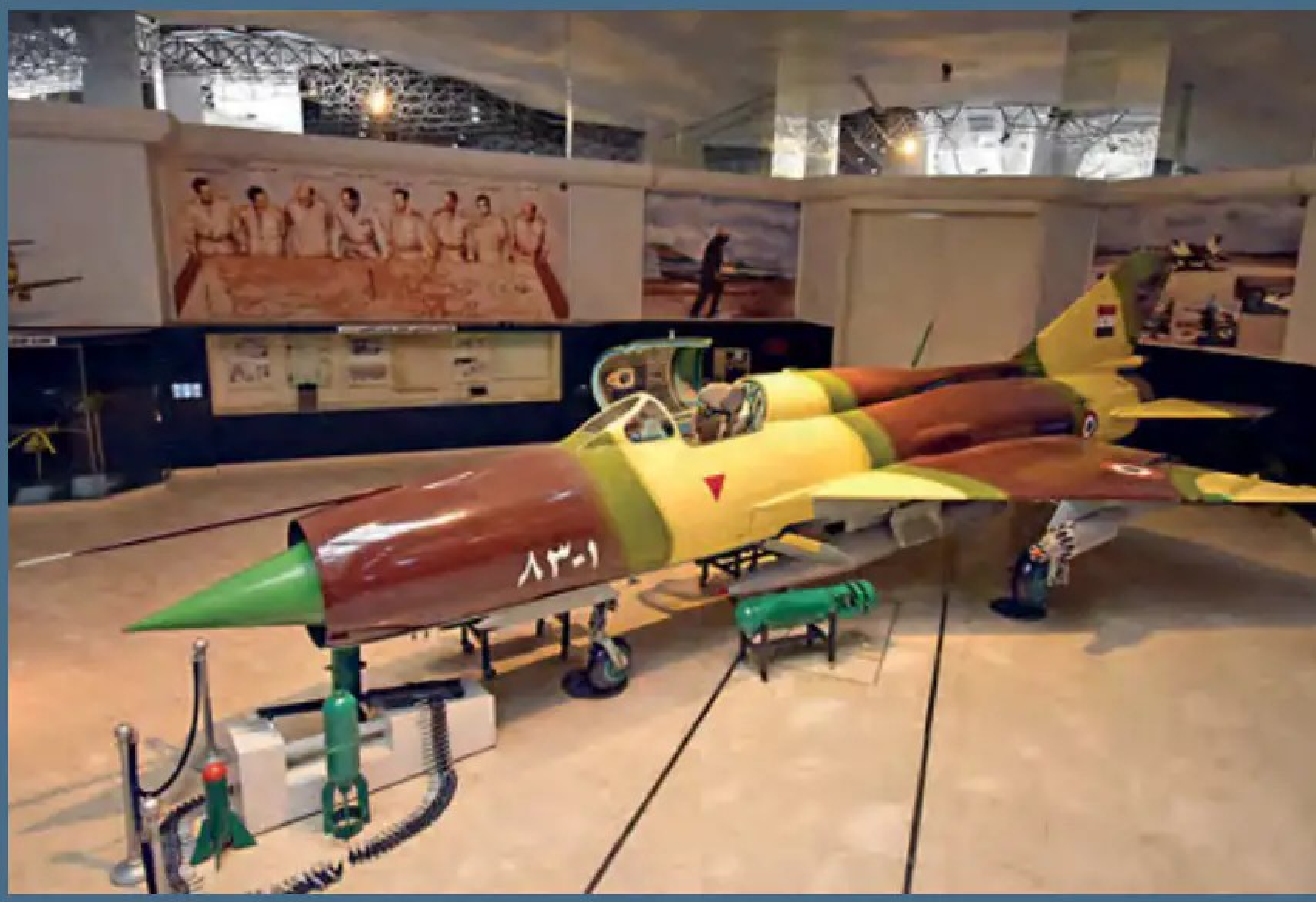
List of museum aircraft at the time of writing:

1501	Aero L-29 Delphin
3367	Aerospatiale SA.342L Gazelle
950	Antonov An-2
9170	Dassault Mirage 5E2
9873	General Dynamics F-16D Fighting Falcon
100	Heliopolis Gomhouria Mk.8R
383	Heliopolis Gomhouria Mk.6
200	Helwan HA-200 Al-Kahira
300	Helwan HA-300
3101	Hiller UH-23A Raven
('1')	Hongdu K-8E Karakorum
1105	Ilyushin Il-14P
7827	McDonnell Douglas F-4E Phantom II
1901	Mikoyan Gurevich MiG-15UTI
2001	Mikoyan Gurevich MiG-17F
3024	Mikoyan Gurevich MiG-19S
5001	Mikoyan Gurevich MiG-21F-13
8301	Mikoyan Gurevich MiG-21PFM
10	Mil Mi-4
801	Mil Mi-6
988	Mil Mi-8T
101	PZL 104-35A Wilga
7001	Sukhoi Su-7BMK
7751	Sukhoi Su-17
7770	Sukhoi Su-20R
4012	Tupolev Tu-16KS
1	Vultee BT-13A Valiant
-	Yakovlev Yak-18
-	Zlin Z-226T

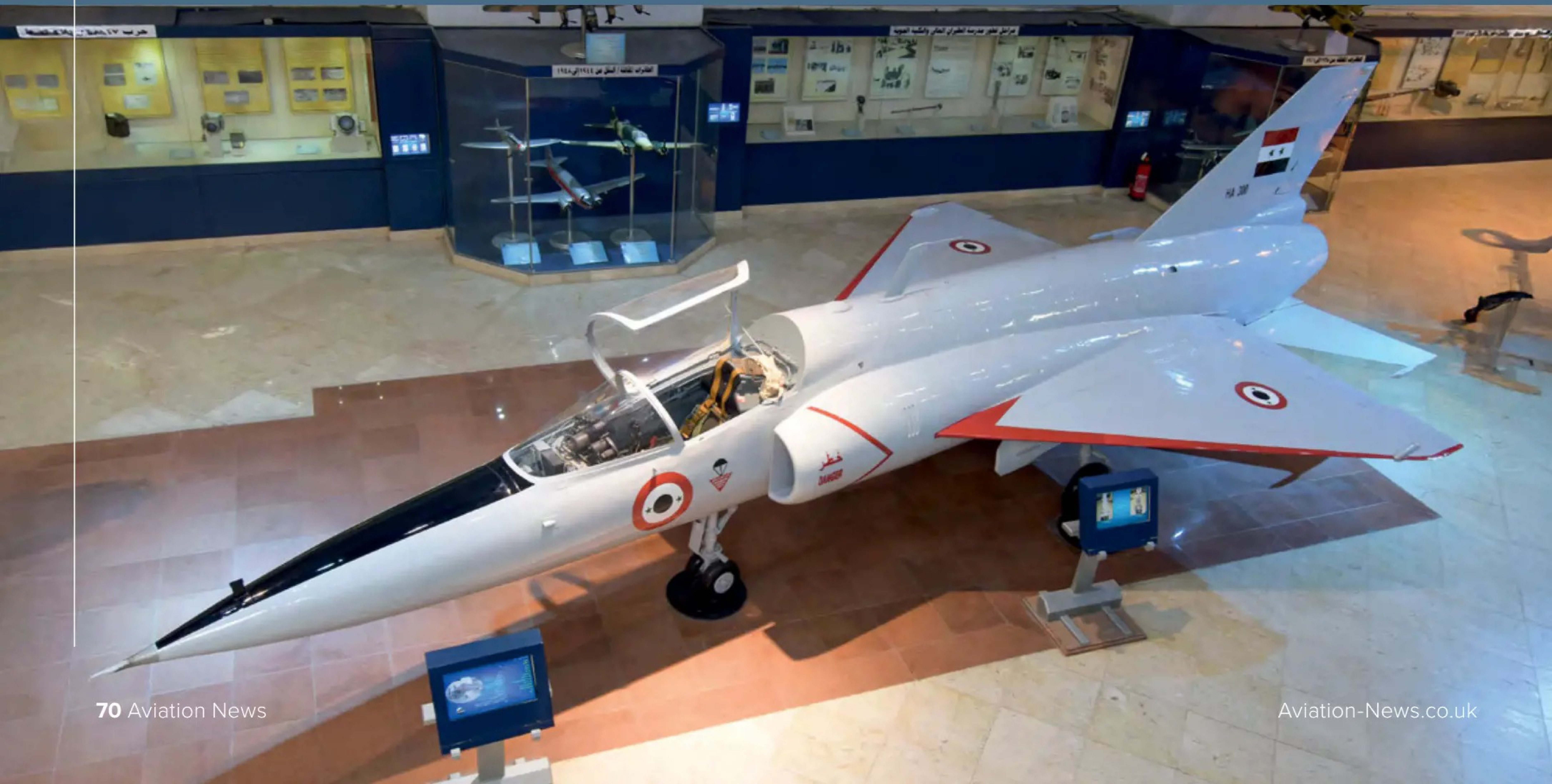
Indoors can be found extensive displays of related material, weaponry, artwork and two more smartly presented jets, one of which is notable for being an indigenous Egyptian product. A 3D cinema presents a film about the 6 October 1973 war and an F-16 flight simulator is open to visitors. Free guided tours are also readily available from the friendly staff, while a shop and a children's play area are also provided.

The EAF motto is 'Higher and higher for the sake of glory' (إلى العلا في سبيل المجد) and that is proudly celebrated throughout this fascinating museum. Opening hours are currently shown as 0900-1500 daily except for closure on Tuesdays, but intending visitors should check latest information. There is a small admission charge (cash only) and foreigners need only show passports to gain access to this truly worthwhile Cairo attraction.

▶ Displayed inside in colourful period camouflage is this MiG-21PFM serialled 8301, originally delivered around 1972.



▼ When Spain abandoned the HA-300 supersonic interceptor project in 1960, Egypt took it over from Hispano Aviación. The design team, headed by Willy Messerschmitt, moved to Helwan in Egypt to continue its work on the aircraft, albeit ambitious and costly. The first of three, powered by a Bristol-Siddeley Orpheus turbojet, flew in March 1964. The aircraft displayed here, the third and last, used an indigenous E-300 engine produced in Egypt but problems with testing and take-off runs meant it never actually flew. The project was finally abandoned in 1969.



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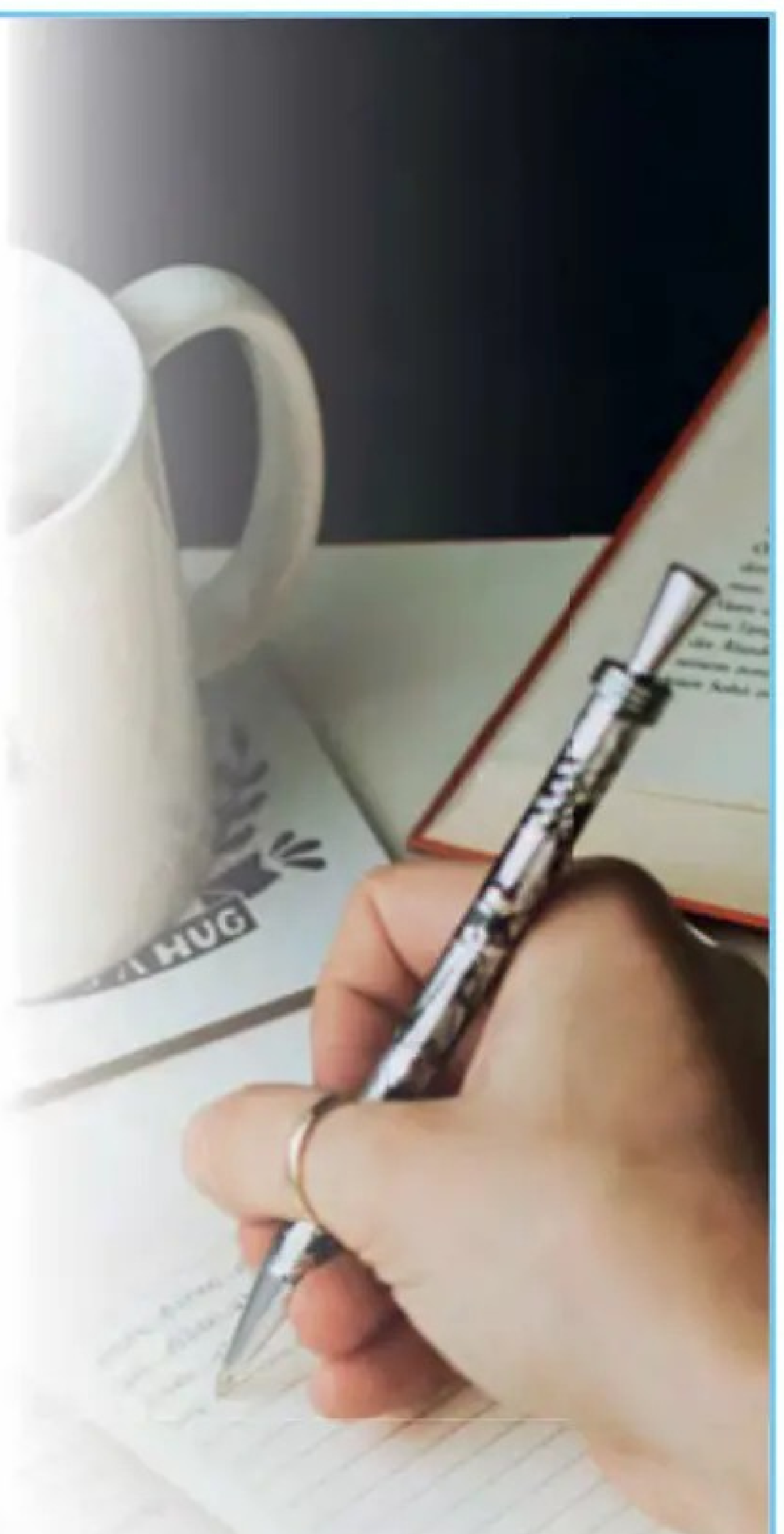

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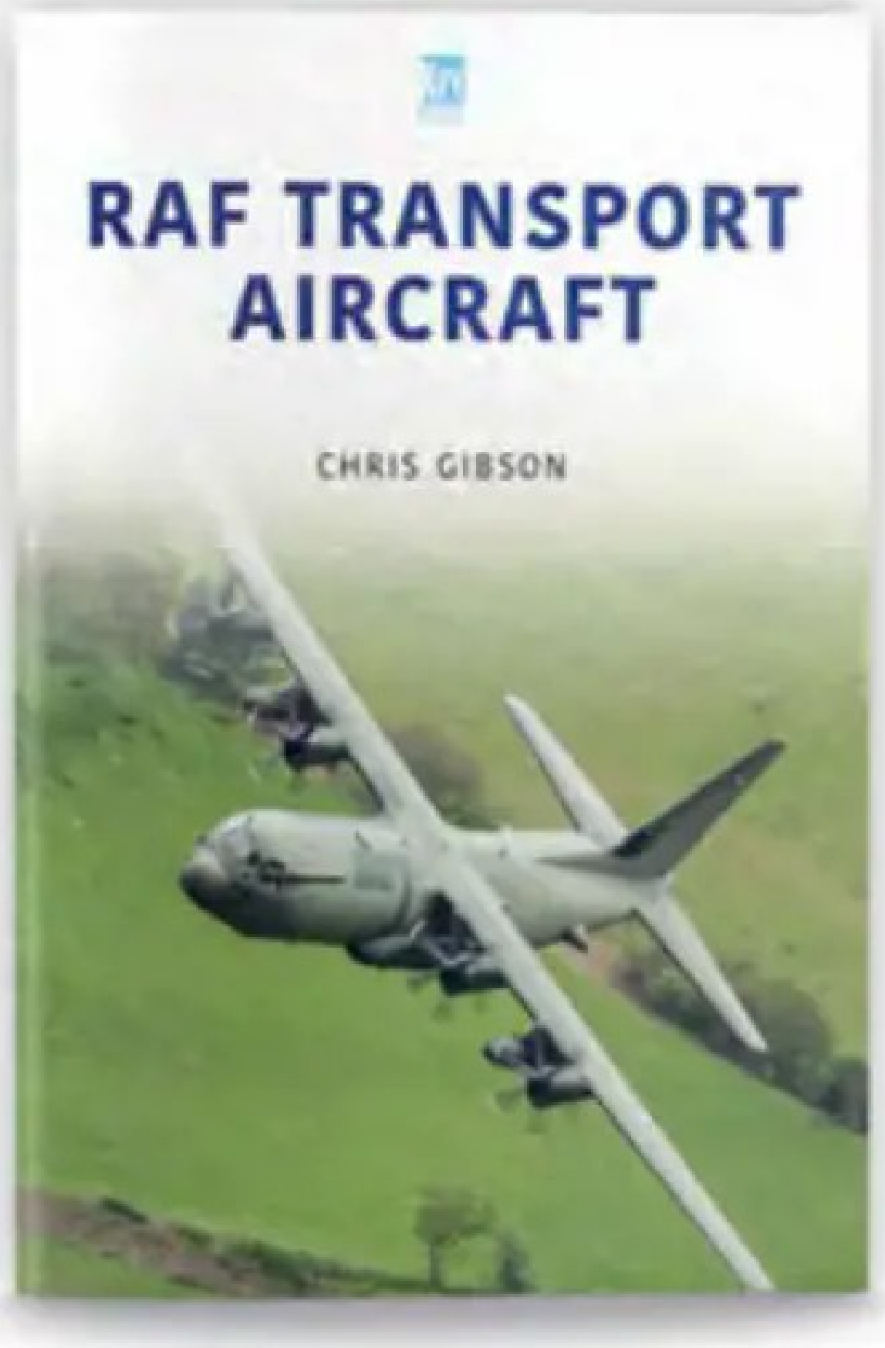

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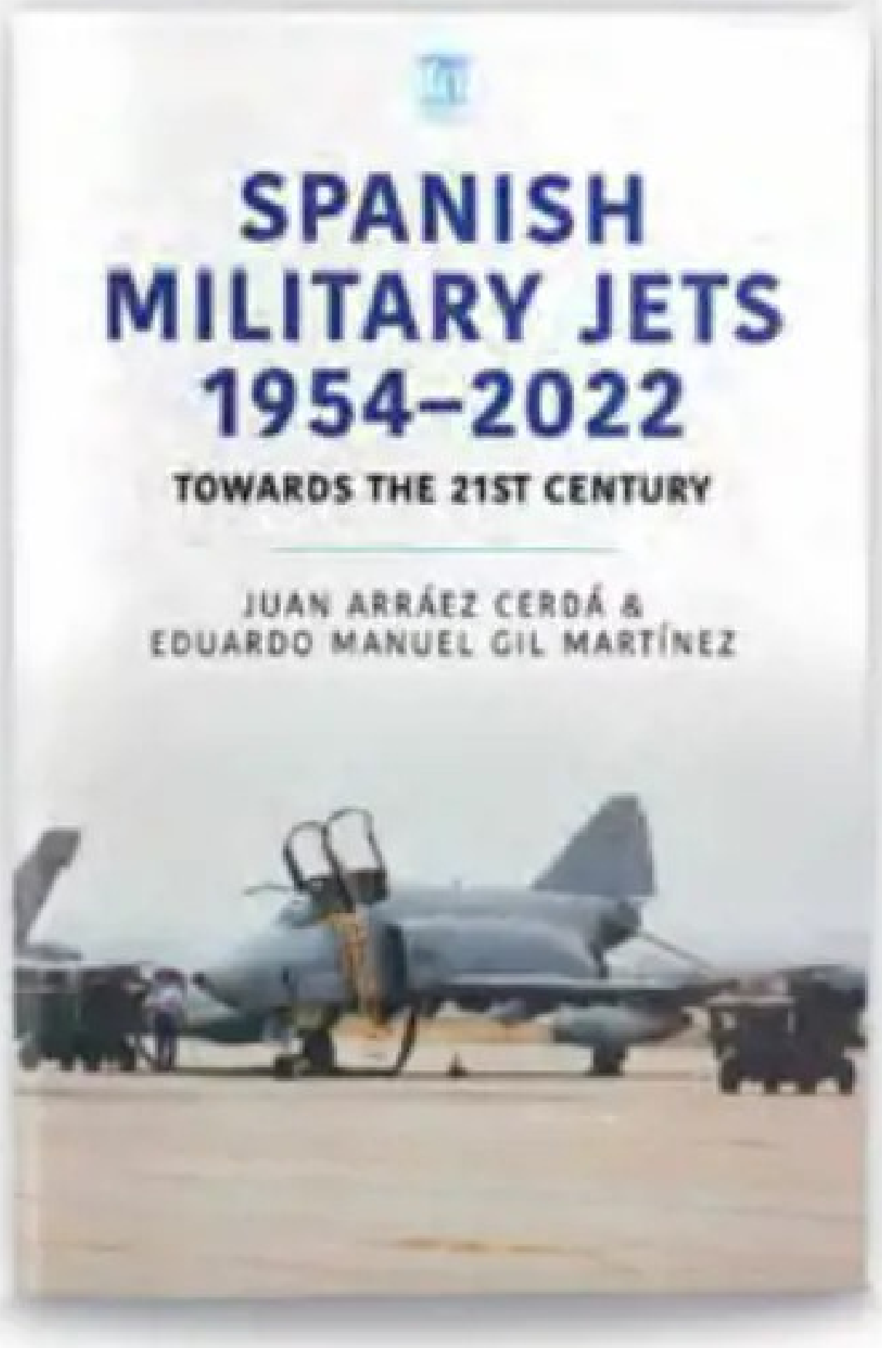
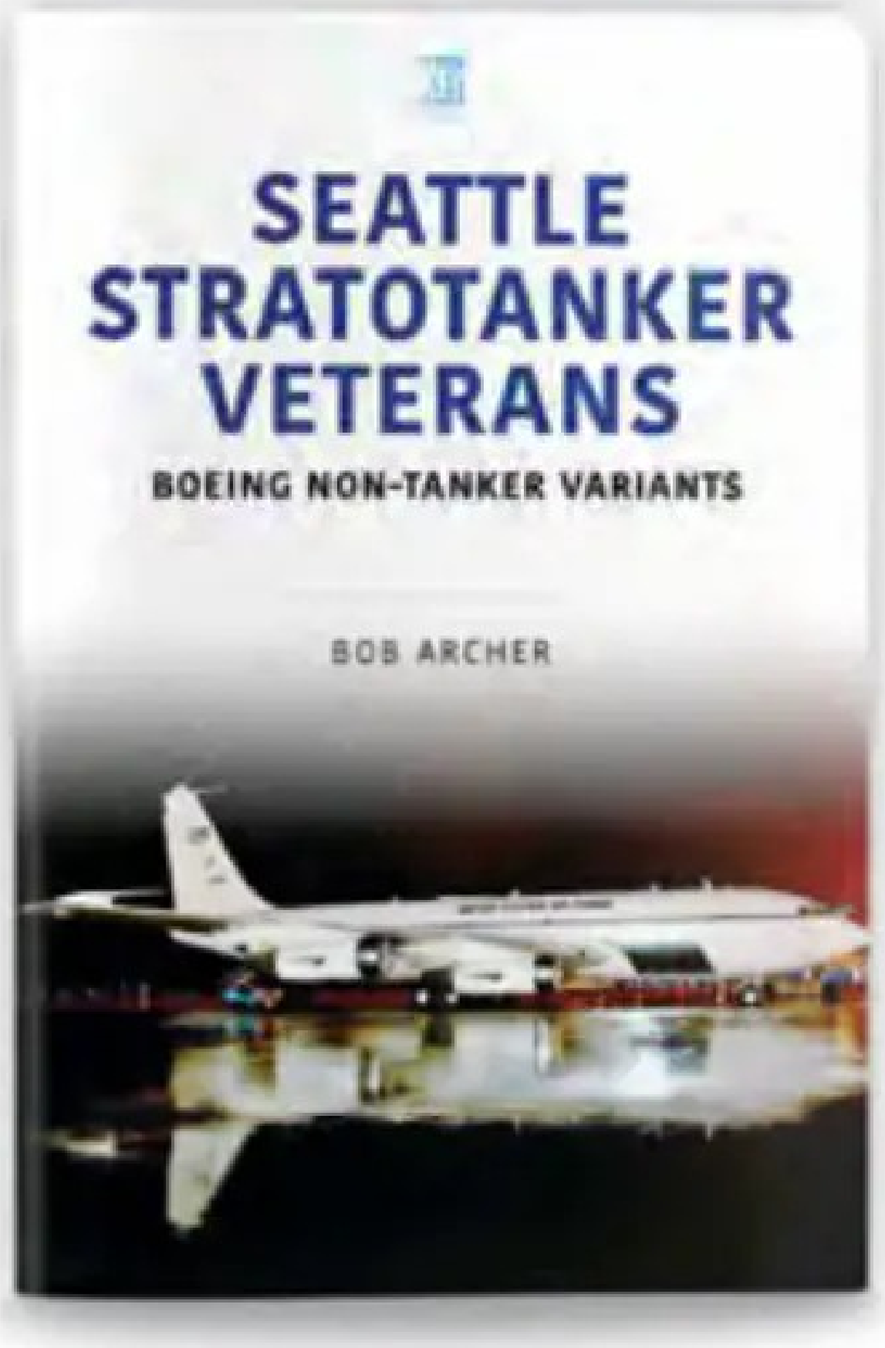


SPANISH MILITARY JETS 1954–2022
TOWARDS THE 21ST CENTURY
JUAN ARRÁEZ CERDÁ & EDUARDO MANUEL GIL MARTÍNEZ



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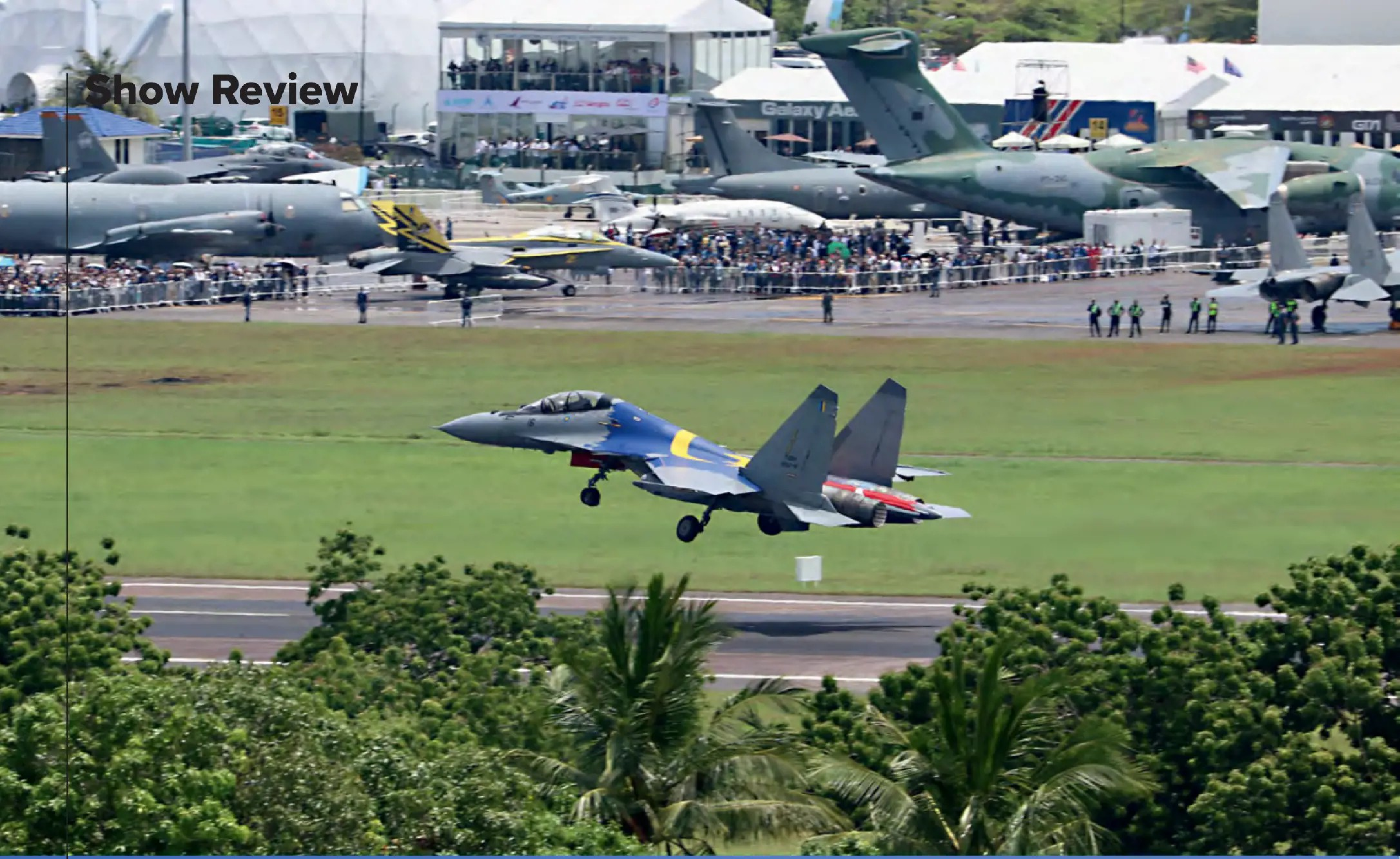


▲ This RMAF *Flanker* wore a special paint scheme for the show known as 'Toruk Makto' – inspired by the film *Avatar*, it means 'Rider of the Last Shadow'. Seen taking off on the opening day, the aircraft was piloted by General Tan Sri Mohd Asghar Khan Goriman, becoming the first Air Force chief to fly an aircraft in the LIMA air show since it began. All Images Steven Coe

LIMA 25

The 17th Langkawi International Maritime and Aerospace Exhibition (LIMA) took place on May 20-24, writes Steven Coe

This bi-annual exhibition takes place at the Mahsuri International Exhibition Centre (MIEC) at Langkawi International Airport with the maritime exhibition a short distance away at Resort World Langkawi (RWL). The first three days are trade days and the last two are open to the public.

LIMA is Southeast Asia's premier aerospace and maritime exhibition, and attracted 500 foreign delegations, 860 exhibitors and 450,000 public visitors, the latter seeing a significant increase on 2023. That said, countries represented dropped to 24 from 30 in 2023, the number of aircraft participating fell sharply from 110 in 2023 to 43 and maritime assets also dropped from 110 to just 31 this year.

There were some notable absences, not least the major US defence companies. Regional players such as China and Russia were represented in the exhibition however, except for the Russian Knights; neither sent any aircraft to the show, and sent a reduced number of ships to the maritime exhibition.

There had been hopes that an F-22 and/or F-35 would appear, neither did. The Su-57 had been rumoured to be participating, but that failed to materialise. The cancellation of the Thai Gripen meant that, Flankers aside, the only modern fighters on display were two US Navy F/A-18Es and an F-15SG of the Republic and Singapore Airforce in the static display.

The late cancellation of the Indian Air Force Surya Kiran Team because of the conflict with Pakistan, plus the grounding of the Royal Malaysian Air Force (RMAF) Hawks due to a nose gear collapse during preparations for LIMA, left the flying display feeling a bit thin. Poor weather caused the curtailment of the much-anticipated US Pacific Fleet flypast planned for

▼ The Russian Knights in a tight formation during their first display at LIMA '25 having only arrived in Langkawi a few hours earlier the opening day – nine Hornets and a Hawkeye from the nearby USS Nimitz had been expected along with two B-52s. This was reduced to a Super Hornet and Growler making one low fast pass as the rain was starting to abate.

The Russian Knights flying six Su-35 and Indonesia's Team Jupiter flying six KAI KT-1B Wongbee were the only foreign participants in the flying display. The rest comprised two RMAF F/A-18D Hornet demos, two RMAF Su-30MKM, and two civilian aerobatic displays from an Extra 300 and Gamebird.

The Gamebird GB1 was flown by Malaysia's first civilian solo aerobatic pilot RMAF veteran Captain John 'Scratchman' Sham.

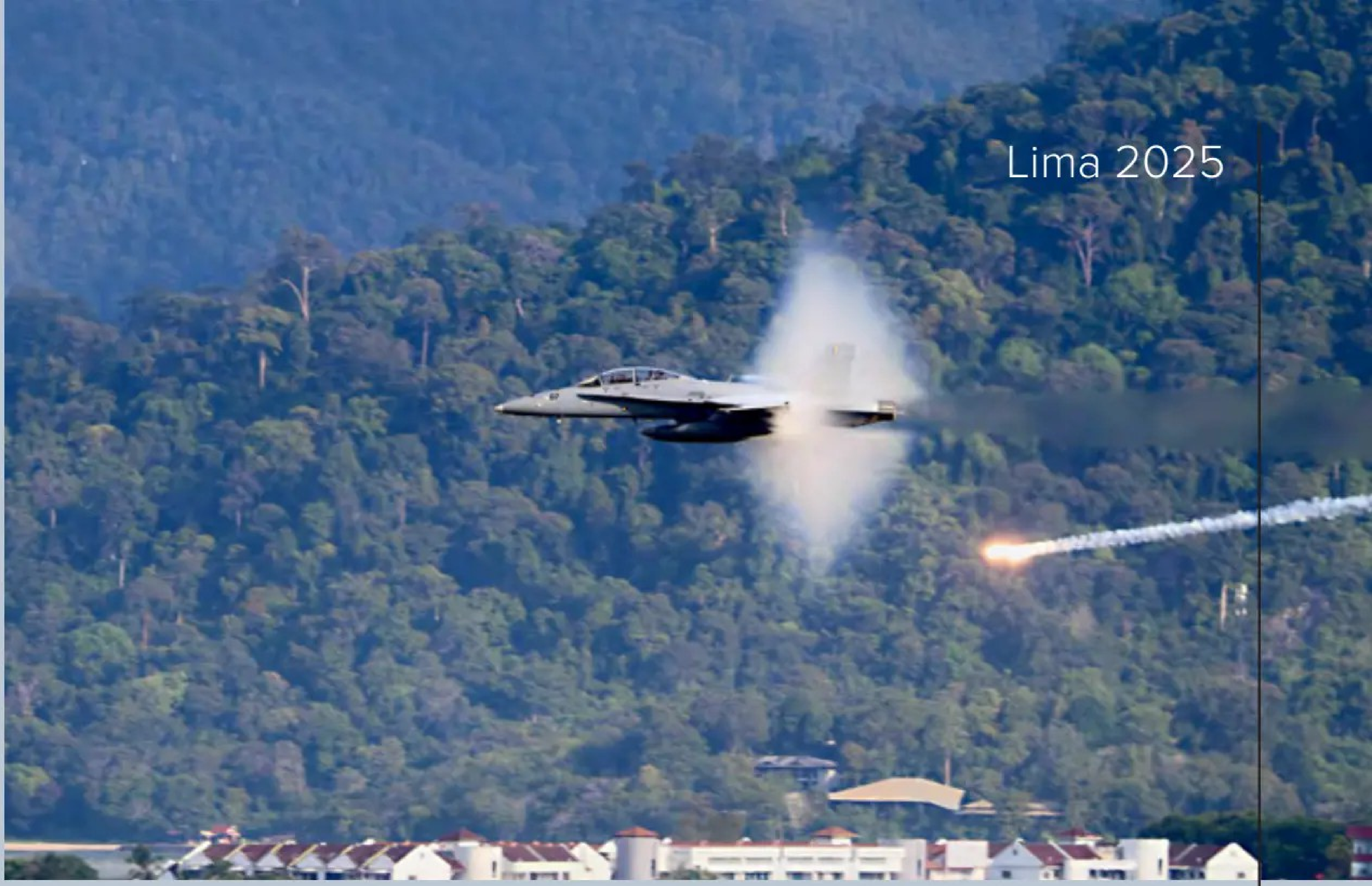
The static display contained several interesting items including a Malaysian Army A109 and MD500, both wearing an attractive camo scheme, a Mi-17 and CL-415 of the Malaysian Fire Department (Bomba), an S-70i from Brunei, US Navy MH-60R, and an Apache and Chinook from Singapore alongside their F-15SG. Embraer bought a Brazilian AF KC-390 and HAL (Hindustan Aeronautics Ltd) bought an Indian civilian registered Dornier Do-228; both flew customer demo flights.

A range of VIP and Military Transport/Support aircraft arrived and departed during the event, particularly during the trade days. With Langkawi being a non-military airfield, A400s and C130s of the RMAF come and go regularly in the build-up to and during the show, ferrying equipment and personnel to/from bases on the mainland. The airport also remains operational during the show and there are regular airliner movements throughout the day from regional operators like Air Asia and Malaysian Airlines.

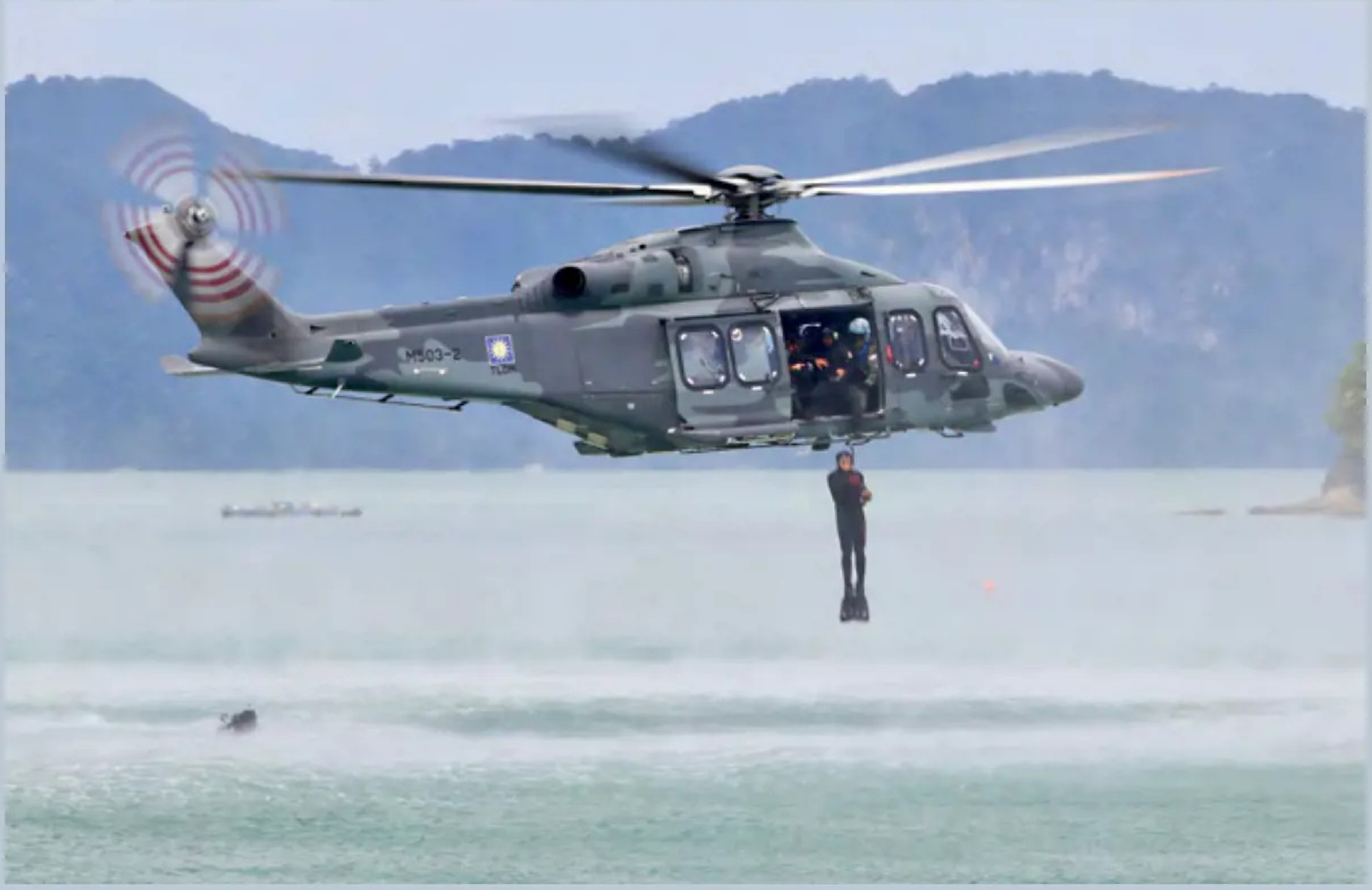
One of the highlights of LIMA is the 'Opening Gambit', a set piece featuring most of the current types in the RMAF. It is practised extensively in the weeks running up to the show, sometimes twice a day, but is only executed once during the show, always on the opening day. This year's Gambit featured fewer aircraft than previous years but was still great to watch. It started with a low-level subsonic sneak pass from an F/A-18D Hornet popping flares, followed by flypasts and breaks from the various types, concluding with pyrotechnics accompanying a final flyover.

The Maritime exhibition also had its own set-piece demonstration featuring rotary assets from the various agencies that protect Malaysian waters as well as a wide range of boats and smaller craft. The centre piece of this was a hostage rescue scenario showing how the various assets work together. This is quite a spectacle and can be watched at very close quarters from the quay at RWL. Boat trips out on the various vessels anchored off the island are also available and each day, different ships are anchored at RWL and can be toured.

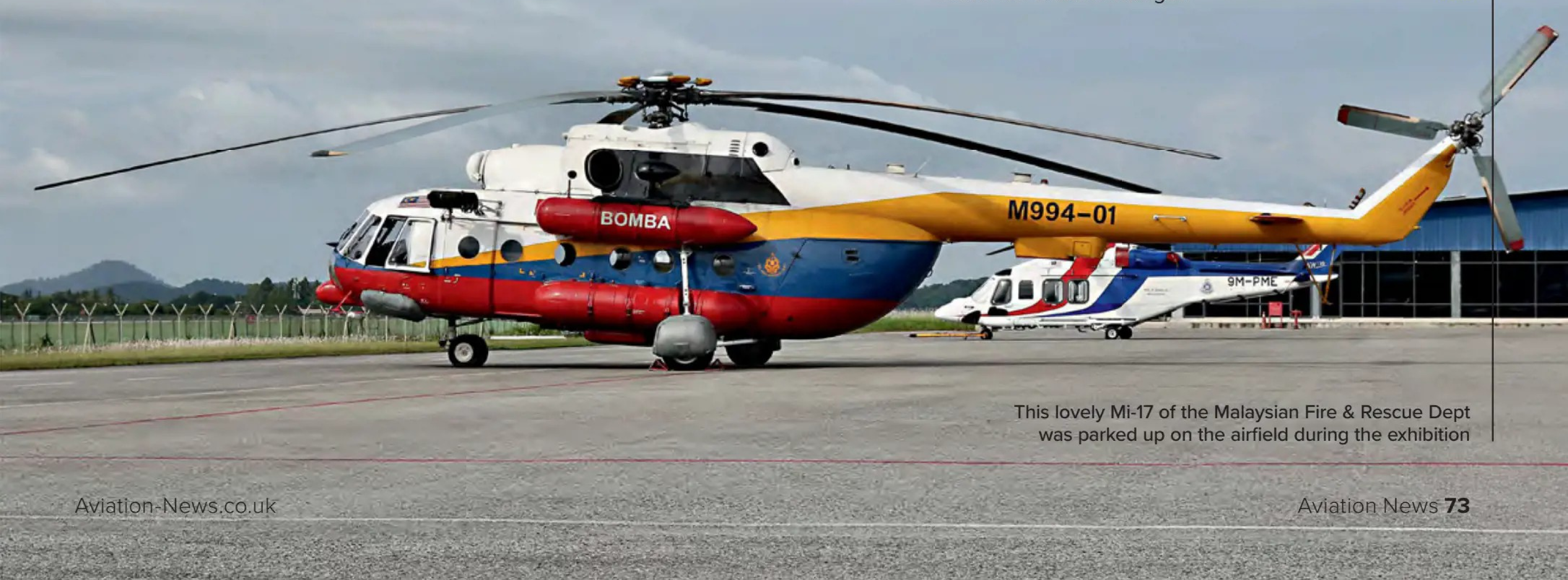
Compared to the 2023 edition, LIMA '25 was a little disappointing, in part due to cancellations but also a lack of participation from some key industry players. World events, changing priorities and budget constraints were no doubt factors. That said, for the aviation enthusiast LIMA still offers the opportunity to see types and operators rarely seen in the West, all in a fabulous location that offers a multitude of photographic vantage points. Hopefully the 2027 event will return stronger. AN



▲ Subsonic sneak pass from the F/A-18D to start the 'Opening Gambit' on day one



▼ A Leonardo AW139 M503-2 of the Royal Malaysian Navy, 203 Squadron, seen from the Quay at RWL during Lima



This lovely Mi-17 of the Malaysian Fire & Rescue Dept was parked up on the airfield during the exhibition

The latest changes on the UK, Irish, Isle of Man and Guernsey registers

Restorations

REG'N	MODE(S)	TYPE	C/N	OWNER
G-APCB	4014DB	Auster J5Q Alpine	3204	AA Beswick, (Headley, Hampshire)
G-AXMW	401836	Beagle B121Pup Series 1	B121-101	JJ Griessel, Eshott, Northumberland
G-BLWT	40239B	Evans VP-1 Volksplane Series 2 (built by GB O'Neill)	PFA 062-10639	GR Howitt (Girvan, South Ayrshire)
G-BPXS	4082B6	Britten-Norman BN-2B-26 Islander (built by Pilatus Britten-Norman Ltd).	2212	D Brem-Wilson, Biggin Hill, Greater London
G-BSMV	4031E9	Piper PA-17 Vagabond (Modified)	17-94	HA Cummings (Rustington, West Sussex)
G-CKBL	405916	Grob G102 Astir CS	1464	M Lessmann, (Ilsenburg, Germany)
G-FDZR	405E23	Boeing 737-8K5	35145	TUI Airways Ltd trading as TUI, London Luton, Bedfordshire (NB)
G-GMAX	40215C	Stampe SV4C (built by Constructions Aeronautiques de Nord)	141	ST Carrel, Turweston, Buckinghamshire
G-MYIH	403745	Mainair Gemini Flash IIA	0937-0293-7-W734	A Phillips, (Westbury, Wiltshire)
G-SBRV	4082BA	Zenair CH.250 Zenith (built by BR Vickers & C Reynolds)	PFA 113-10683	BR Vickers, (Shenstone, Staffordshire)
G-TAWZ	407D10	Boeing 737-86N	32669	TUI Airways Ltd trading as TUI, London Luton, Bedfordshire (NB)

New Registrations

REG'N	MODE(S)	TYPE	C/N	OWNER
G-CMXE	40816D	Airbus Helicopters Deutschland MBB-BK 117 D-3	21377	Airbus Helicopters UK Ltd, Oxford, Oxfordshire (for Royal Air Force as a Jupiter HC2)
G-CMXF	40816E	Airbus Helicopters Deutschland MBB-BK 117 D-3	21390	Airbus Helicopters UK Ltd, Oxford, Oxfordshire (for Royal Air Force as a Jupiter HC2)
G-CMYJ	4082AF	Tecnam P-Mentor	1151	Aeros Leading Ltd, Wellesbourne Mountford, Warwickshire
G-CMYL	4082AD	Tecnam P-Mentor	1152	Aeros Leading Ltd, Wellesbourne Mountford, Warwickshire
G-CMYR	408202	Eurocopter AS365N3 Dauphin 2	6870	FR Aviation Ltd trading as Draken, Bournemouth, Dorset (NB) (reportedly for Army Air Corps)
G-CMZS	4082B4	Rans S7S Courier	LAA 216-15902	DH Pattison, (Liddington, Wiltshire)
G-CNAP	408232	Aeropro EuroFOX 3K (assembled by Ascent Industries Ltd)	72725	Deeside Gliding Club (Aberdeenshire) Ltd, Aboyne, Aberdeenshire
G-CNAR	408231	Pegasus QuikR (built by Pegasus Sport Aviation Ltd)	8023	GS Aviation (Europe) Ltd, Clench Common, Wiltshire
G-CNBR	4082B7	Diamond S-77	DB-DN-039	AM Holly, (Breadstone, Gloucestershire)
G-CWDB	408258	Halley Exodus Deltajet 500 Stingray (assembled by Flylight Airsports Ltd)	EA-030	DWC Beer, (Farringdon, Devon)
G-EMCG	4080AC	Jonker JS-MD-3 (assembled by MD Flugzeugbau GmbH & Co KG)	3.MD227	TJ Scott, (Wainhill, Oxfordshire)
G-EMCS	4081E9	HPH 304TS	046-TS	TJ Highton (Lakenheath, Suffolk)
G-FLIE	4081E2	TL Ultralight TL-2000 Sting S4	25-ST515	AJ Byford (Bourne, Cambridgeshire)
G-GDSP	408212	Leonardo A109S Trekker	22781	Sloane Helicopters Ltd, Sywell, Northamptonshire
G-HLYL	40823D	Airbus A321-251NX	12553	Jet2.com Ltd, Leeds-Bradford, West Yorkshire
G-ISLP	408281	ATR-72-212A	1167	Blue Islands Ltd, Jersey, Channel Islands
G-MCRV	4082B8	Van's RV-14A	LAA 393-15917	MW Clarke (Winkhill, Staffordshire)
G-NIKA	4082BD	Cessna 525 Citation M2	525-1040	Comis Air Ltd, (East Baldwin, Isle of Man)
G-OCOX	4082BE	Worner NL-STU/1000	1054	CA Butter, Trustee of The Hydrogen Balloon Group (Marsh Benham, Berkshire)
G-OHSE	408278	Airbus EC175B	5080	Offshore Helicopters Services UK Ltd, Aberdeen International, Aberdeenshire
G-ORGB	40828B	UltraMagic H-77	77/441	AD McCutcheon (Hetton, North Yorkshire)
G-RFRV	406845	Van's RV-9A (built by NJ Williams-Jones)	LAA 320-15128	PG Folland, Trustee of Radley Farm RV Group, Radley Farm, Hungerford, Berkshire
G-SLVA	40829E	Pilatus PC-24	541	Select Aircrafts Ltd, Manchester, Greater Manchester
G-TESH	408148	Diamond DA40D Star TDi	D4.309	Tesla Solutions Ltd, Oxford, Oxfordshire
G-TNEF	4081BB	Airbus A321-251NX	12481	British Airways PLC, London Heathrow, Middlesex
G-TNEG	4081BC	Airbus A321-251NX	12484	British Airways PLC, London Heathrow, Middlesex
G-TSOO	4082A5	Hughes 369D	600666D	DW Walton, Bruntingthorpe, Leicestershire
G-ULIT	40825C	Boeing 737-8	43001	Ascend Airways Ltd, London Gatwick, West Sussex (NB)
G-XDMK	4082B9	Scottish Aviation Bulldog Srs.120 Model 121	BH120/336	TW Harris, Duxford, Cambridgeshire
G-XLRA	4081CF	Airbus A321-271NY	11631	Wizz Air UK Ltd, London Luton, Bedfordshire
G-XXTH	407003	Bell 505 (built by Bell Textron Canada Ltd)	65447	Pegasus Grab Hire Holdings Ltd (Droitwich, Worcestershire)
EI-HNT	TBA	Airbus A320-214	6375	MacQuarie Aerospace Ireland Ltd, (stored at Prague-Ruzyne, Czech Republic)
EI-HPC	TBA	Czech Aircraft Works Sportcruiser	08SC215	Private Individual (Co. Wicklow)
EI-HPD	TBA	Airbus A320-271N	8397	APF 1 Project No.12 Ltd (stored Kuala Lumpur-Sepang, Malaysia)
EI-HPJ	4CAF0A	ATR-72-212A	1181	Emerald Airlines Ireland Ltd, Dublin, Co. Fingal (operated for Aer Lingus Regional)
EI-HPK	4CAF0B	ATR-72-212A	1249	Emerald Airlines Ireland Ltd, Dublin, Co. Fingal (operated for Aer Lingus Regional)
EI-HPO	TBA	Airbus A320-271N	8511	APF 4 Project No.8 Ltd (stored Chongqing-Jiangbei, People's Republic of China)

EI-HPR	TBA	Comco Ikarus C42B Bravo	0701-6862	Private Individual, (Co. Roscommon)
EI-HRD	4CAED4	Boeing 737-86J(BDSF)	30498	ASL Airlines (Ireland) Ltd, Shannon, Co. Clare (operated for DHL Worldwide Express)
EI-HRK	TBA	Reims Cessna F172M	1354	Private Individual, Ballyboy, Athboy, Co. Meath
EI-IRG	TBA	Leonardo AW189	89023	Bristow Ireland Ltd, Shannon, Co. Clare (operated for Irish Coast Guard)
EI-KFH	4CAF10	Airbus A320-271N	12607	Avalon Leasing Ireland 3 Ltd, (operated by FlyArystan, Nur-Sultan, Kazakhstan
EI-LDG	4CAE27	Airbus A300F4-605R	870	ASL Airlines Ireland Ltd, Leipzig, Germany (operated for DHL Worldwide Express)
EI-SCG	4CAD97	Airbus A320-251N	12585	Scandinavian Airlines Ireland Ltd, Stockholm-Arlanda, Sweden
EI-XLV	4CAE33	Airbus A321-251NY	12248	Aer Lingus Ltd, Dublin, Co. Fingal
M-APLE	424C9B	Bombardier Global 5000	9851	Waylawn Ltd, TBA
M-ASBA	424C9D	Bombardier Challenger 3500	21057	Aviation Finance & Leasing Ltd, London Stansted, Essex (operated by Ryanair)
M-ILLS	43E980	Bell 429 GlobalRanger	57107	Nigel Brunt Properties Ltd, Elstree, Hertfordshire
M-RTEE	424BE3	Learjet 40	45-2017	Nextasea 2 Ltd, Biggin Hill, Greater London
2-AARC	TBA	Airbus A319-112	1618	AAR International Inc (stored St Athan, Vale of Glamorgan)
2-ALFR	TBA	Airbus A330-343	720	Alfor Aviation & Technical Services Ltd (stored Beja, Portugal)
2-BSSO	TBA	Airbus A320-232	5461	ALC A320 5461 Ltd (stored Tainjin-Binhai, People's Republic of China)
2-GALA	43F79A	Piper PA-31P-350 Mojave	31P-8414049	Gala LG SA, Sion, Switzerland
2-GNKA	TBA	Eurocopter EC225LP Super Puma 2+	2779	Airbus Helicopters SAS, TBA
2-HDYJ	TBA	Boeing 737-8JP	39045	UMB Bank N.A. (stored Bucharest-Băneasa, Romania)
2-IMMN	TBA	Diamond DA20-C1 Katana	C0569	Diamond Flight Training Co. Ltd, Oxford, Oxfordshire
2-JECP	TBA	de Havilland DHC-8-402 (built by Bombardier)	4136	Regional One Inc (stored Malta-Luqa, Malta)
2-MMWD	43F7C2	Cessna A185E Skywagon	185-01996	Claymore AS Ltd, L'Aquila, Italy
2-ONEL	43F7C0	Learjet 75	45-535	One Private Charter Services Ltd, Jersey, Channel Islands
2-PJAB	TBA	Fokker F.28 Mk.070	11585	11585Airline Technical Support Caribe B.V. (stored Willemstad-Hato, Curacao)
2-SILK	TBA	Dassault Falcon 2000S	744	Pacific Azur Co Ltd, TBA
2-TECY	TBA	Airbus A320-233	5050	Royal Air Charter Service Inc (stored at Haikou Meilan International, Hainan, People's Republic of China)
2-VBZA	TBA	Boeing 737-76N	32674	Celestial Aviation Trading 64 Ltd, (stored Belo Horizonte, Brazil)
2-VNYL	TBA	Bombardier CRJ-200ER	7546	Mymarian Ltd (stored Riga, Latvia)
2-WKTP	TBA	Beech B300 King Air 350	FL-203	DEA Aviation Ltd, Gamston, Retford, Nottinghamshire

Cancellations

REG'N	TYPE	C/N	Fate
G-AGAT	Piper J3F-50 Cub	4062	Re-registered as G-KCUB
G-APCB	Auster J5Q Alpine	3204	Cancelled by CAA (but restored again later in the month)
G-APTY	Beech G35 Bonanza	D-4789	To Iceland
G-BADV	Brochet MB50 Pipistrelle	78	To France
G-BNDR	SOCATA TB10 Tobago	740	To Belgium as OO-KPJ
G-BOGO	Piper PA-32R-301T Turbo Saratoga SP	32R-8029064	To Italy
G-BOTP	Cessna 150J	150-70736	Cancelled as Permanently WFU (CofA expired 23.07.21. Last reported in Nalson Aviation yard at Caterham 04.22)
G-BPDT	Piper PA-28-181 Archer II	28-8416004	To Poland
G-BVMR	Cameron V-90	3269	Cancelled as permanently WFU (CofA expired 06.05.25)
G-BWWF	Cessna 185A Skywagon	185-0240	Cancelled by CAA (CofA expired 13.05.22, details unknown)
G-BZGM	Mainair Blade 912	1247-0400-7-W1040	Cancelled by CAA, Permit to Fly expired 19.06.25)
G-CBIF	Avtech Jabiru UL-450	PFA 274A-13789	Cancelled as Destroyed (Overturned on landing at Westonzoyland, Somerset 22.03.25)
G-CDTT	ICP MXP-740 Savannah Jabiru(4)	BMAA/HB/383	Cancelled by CAA (Permit to Fly expired 07.06.11. Last reported at Oaks Farm, Woodton, Norfolk 02.12)
G-CHFW	Schleicher K.8B	8108	Cancelled as Permanently WFU (CofA expired (CofA expired 03.02.23, last reported at RAF Weston-on-the-Green, Oxfordshire 08.23)
G-CIMH	P & M Aviation Quik Lite	8706	Cancelled by CAA (SSDR microlight, no Permit to Fly required)

Previous Identities

Reg'n	Previous Identity
G-BPXS	ex D-ILFH
G-CMXE	ex D-HADV
G-CMXF	ex D-HBTQ
G-CMYR	ex N301EP
G-FDZR	ex C-FIZR
G-GDSP	ex I-EASQ
G-HLYL	ex D-AZYX
G-ISLP	ex N167JL
G-NIKA	ex N730CP
G-OCOX	ex D-OCOX
G-OHSE	ex F-WJXP
G-RFRV	ex G-RVWJ
G-SLVA	ex T7-VITA
G-TAWZ	ex OO-SRO
G-TESH	ex 2-TESH
G-TNEF	ex D-AZYH
G-TNEG	ex D-AZYG
G-TSOO	ex (RP-S5728), Israel Defence Force 221
G-ULIT	ex 9H-TAU
G-XDMK	ex XX690
G-XLRA	ex D-AZXU
G-XXTH	ex G-XXLH
EI-HNT	ex 9K-AKF
EI-HPC	ex PH-BEM
EI-HPD	ex VT-IVR
EI-HPJ	ex M-CTRE
EI-HPK	ex M-ABRP
EI-HPO	ex VT-IZG
EI-HPR	ex D-MESS
EI-HRD	ex N916SC
EI-HRK	ex G-YORK
EI-IRG	ex G-CMTP
EI-KFH	ex F-WWTS
EI-LDG	ex B-LDG
EI-SCG	ex F-WWIE
EI-XLV	ex D-AZXD
M-APLE	ex OE-IMB
M-ASBA	ex C-GOXZ
M-ILLS	ex M-YMCM
M-RTEE	ex M-KING
2-AARC	ex ER-00002
2-ALFR	ex HS-XTG
2-BPDG	ex 9M-WCZ
2-BSSO	ex B-9900
2-GALA	ex N398RD
2-GNKA	ex YR-ZZI
2-HDYJ	ex LN-DYJ
2-IMMN	ex G-IMMN
2-JECP	ex G-JECP
2-MMWD	ex G-OMUD
2-ONEL	ex G-USHA
2-PJAB	ex PJ-JAB
2-SILK	ex VP-CTV
2-TECY	ex RP-C509
2-VBZA	ex LV-BZA
2-VNYL	ex VQ-BIX
2-WKTP	ex G-WKTP

G-CJDR	Schleicher ASW-15	15053	Cancelled as Permanently WFU (CofA expired 23.08.21)
G-CKNX	Ozone Power Buzz Z4 ML/Parajet VI	BZ4ML-0-36C-015/000367	Cancelled by CAA (SSDR microlight, no Permit to Fly required)
G-CLJM	Reims Cessna F172G	0249	To Italy
G-CMGB	Evektor Sportstar SLM	2022-2205	Cancelled as Destroyed (Fatal crash at an Industrial Estate in Chesterfield, Derbyshire 01.09.24)
G-CMPH	Piper PA-28-161 Cadet	2841175	To USA
G-CMTP	Leonardo AW189	89023	To Republic of Ireland as EI-IRG
G-CMVR	Aeros Fox 13TDS/ Flylight Peabee Red Line	7371	Cancelled as permanently WFU (SSDR microlight, no Permit to Fly required)
G-DEAU	Schleicher K.7 Rhönadler	7092	Cancelled by CAA (CofA expired 06.09.10)
G-DHLL	Boeing 767-304ER(BDSF)	28040	To Austria as OE-LYB
G-EEEK	Extra EA.300/200	1034	Cancelled by CAA (crashed at Spanhoe, Northamptonshire 13.07.24)
G-ETAT	Cessna 172S Skyhawk SP	172S8674	To USA as N6245E
G-FEMC	Learjet 45	45-097	To Canada as C-FEML
G-FIDL	Thruster T600T 450 JAB	0032-T600N-062	Cancelled as Destroyed (Permit to Fly expired 17.05.25, details unknown)
G-IMMN	Diamond DA20-C1 Katana	C0569	To Guernsey as 2-IMMN
G-MSHP	Piper PA-46-600TP M600	4698250	To USA as N600TR
G-MVLB	Aerial Arts Chaser S	CH763	Cancelled by CAA (SSDR microlight, no Permit to Fly required)
G-MWCE	Mainair Gemini Flash IIA (Modified)	772-1289-7-W568	Cancelled by CAA (SSDR microlight, no Permit to Fly required)
G-MWST	Medway Hybred 44XLR	MR118/98	Cancelled as Destroyed (Permit to Fly expired 03.08.05)
G-MWSX	Whittaker MW5 Sorcerer	PFA 163-11549	Cancelled by CAA (SSDR microlight, no Permit to Fly required)
G-MYSW	Solar Wings Pegasus Quantum 15	6834	Cancelled as Permanently WFU (Permit to Fly expired 14.05.15)
G-MYXM	Mainair Blade	1047-0795-7-W845	Cancelled by CAA (Permit to Fly expired 03.12.17)

Updates & Corrections

Reg'n	Details
G-CFWR	Type officially changed to a Skyranger Swift 912(1) 09.05.25
G-CGVC	Became N771C 04.06.25
G-CIFN	Type officially changed to a C42 FB80 Bravo 23.05.25
G-CILD	Type officially changed to a Replica Curtiss Model D 23.05.25
G-CMNL	Type officially changed to a Skyranger Swift 912(1) 06.05.25
G-CMVV	Builder officially changed to P Hazlehurst, A Moyce & K Wilkie 01.05.25
G-COSA	Builder officially changed to TM Conway, HJ Sanganee & P Hennessy 13.05.25
G-ENRE	Type officially changed to a Jabiru SPL-450 01.05.25
G-ILLE	Became N557EH 08.05.25
G-JLCA	Became N234FY 19.05.25
G-MDTC	Became LN-OSP 13.05.25
G-MVZV	Type officially changed to a Pegasus XL-R (Modified) 07.05.25)
G-MYEA	Type officially changed to a Pegasus XL-R (Modified) 12.05.25)
G-OMUD	Became 2-MMWD 04.04.25
G-WKTP	Became 2-WKTP 24.04.25
G-XTHT	Became 32-1482 (Australian ultralight registration) 05.17
EI-DTH	Became LY-MAD 03.25
M-ABRS	Became PK-YSQ 11.24
M-ATTS	Became C-GLBY 25.03.25
M-JCBE	Became C-FILG 21.05.25
M-OLTT	Became C-GMRX 02.05.25
2-WANA	Became V5-ABW 10.24

G-MZEZ	Pegasus Quantum 15-912	7285	Cancelled by CAA (Permit to Fly expired 29.08.24)
G-MZGF	Letov LK-2M Sluka	PFA 263-13073	Cancelled by CAA (SSDR microlight, no Permit to Fly required)
G-MZZY	Mainair Blade 912	1050-0895-7-W848	Cancelled by CAA (Permit to Fly expired 04.09.14)
G-NHAC	Eurocopter AS365N2 Dauphin 2	6497	Cancelled as Permanently WFU (CofA expires 20.09.25, roaded to Dublin Weston, Republic of Ireland 04.25)
G-PJWW	Airbus EC130 T2	9367	To Brazil as PS-JRZ
G-PRZI	Cameron A-375	11798	Cancelled as Permanently WFU (CofA expired 07.12.22)
G-ROEI	Avro Roe 1 Replica	PFA 344-14629	Cancelled as Permanently WFU (No Permit to Fly issued, stored at Brooklands Museum, Surrey)
G-RVWJ	Van's RV-9A	LAA 320-15128	Re-registered as G-RFRV
G-TESC	Diamond DA40D Star TDi	D4.286	To Belgium as OO-SKF
G-UFCB	Cessna 172S Skyhawk SP	172S8318	To USA
G-WAKE	Mainair Blade 912	1244-0300-7-W1037	Cancelled by CAA (Permit to Fly expired 01.01.15)
G-XXEB	Sikorsky S-76C	760753	To Malta as 9H-FXVC
G-XXLH	Bell 505 JetRanger X	65337	Re-registered as G-XXTH
G-YORK	Reims Cessna F172M	1354	To Republic of Ireland as EI-HRK
EI-EJN	Airbus A330-202	1313	To USA as N3103S
EI-HDN	Airbus A330-343(F)	1146	To USA as N821CM
EI-HKT	Leonardo AW189	89002	To Netherlands as PH-RSQ
EI-IKF	Airbus A320-214	1473	To Bulgaria as LZ-EAL
EI-ULN	Boeing 737-73V	32426	to Lithuania
M-ABPR	Embraer 175	17000323	Cancelled as Dismantled (parted out at Katowice, Poland)
M-ABPS	Embraer 175	17000324	Cancelled as Dismantled (parted out at Katowice, Poland)
M-ABRP	ATR-72-212A	1249	To Republic of Ireland as EI-HPK
M-ABTN	Airbus A320-216	2842	To Lithuania as LY-TAP
M-CTRE	ATR-72-212A	1181	To Republic of Ireland as EI-HPJ
M-KING	Learjet 40	45-2017	Re-registered as M-RTEE
M-SVGS	Airbus A330-343X(P2F)	1338	To Germany as D-ALMG
M-YMCM	Bell 429	57107	Re-registered as M-ILLS
M-YOBO	Cessna 525C CitationJet CJ4	525C-0425	To Switzerland as HB-VJT
2-AARC	Airbus A319-112	1618	Cancelled by Guernsey Aircraft Register (parted out at St. Athan, Glamorgan 06.25)
2-ADAE	Airbus A320-271N	11052	To Turkey
2-BSSO	Airbus A320-232	5461	To South Africa as ZS-SZM
2-CCXB	Boeing 737-7K2	38125	To Argentina as LV-ARR
2-HAIB	ATR-42-500	637	To Kenya as 5Y-RNV
2-KCRF	Boeing 737-86N	36812	To USA as N238HR
2-SALA	Piper PA-32-300 Six	32-7940106	To United Kingdom as G-SALA
2-SILK	Dassault Falcon 2000S	744	To Vietnam as VN-A238
2-TESH	Diamond DA40D Star TDi	D4.309	To United Kingdom as G-TESH
2-TWDC	Airbus A320-271N	11130	To Turkey

Key: NB – Nominal Base. A place name in brackets relates to the owner's address, as where the aircraft is based is unknown.

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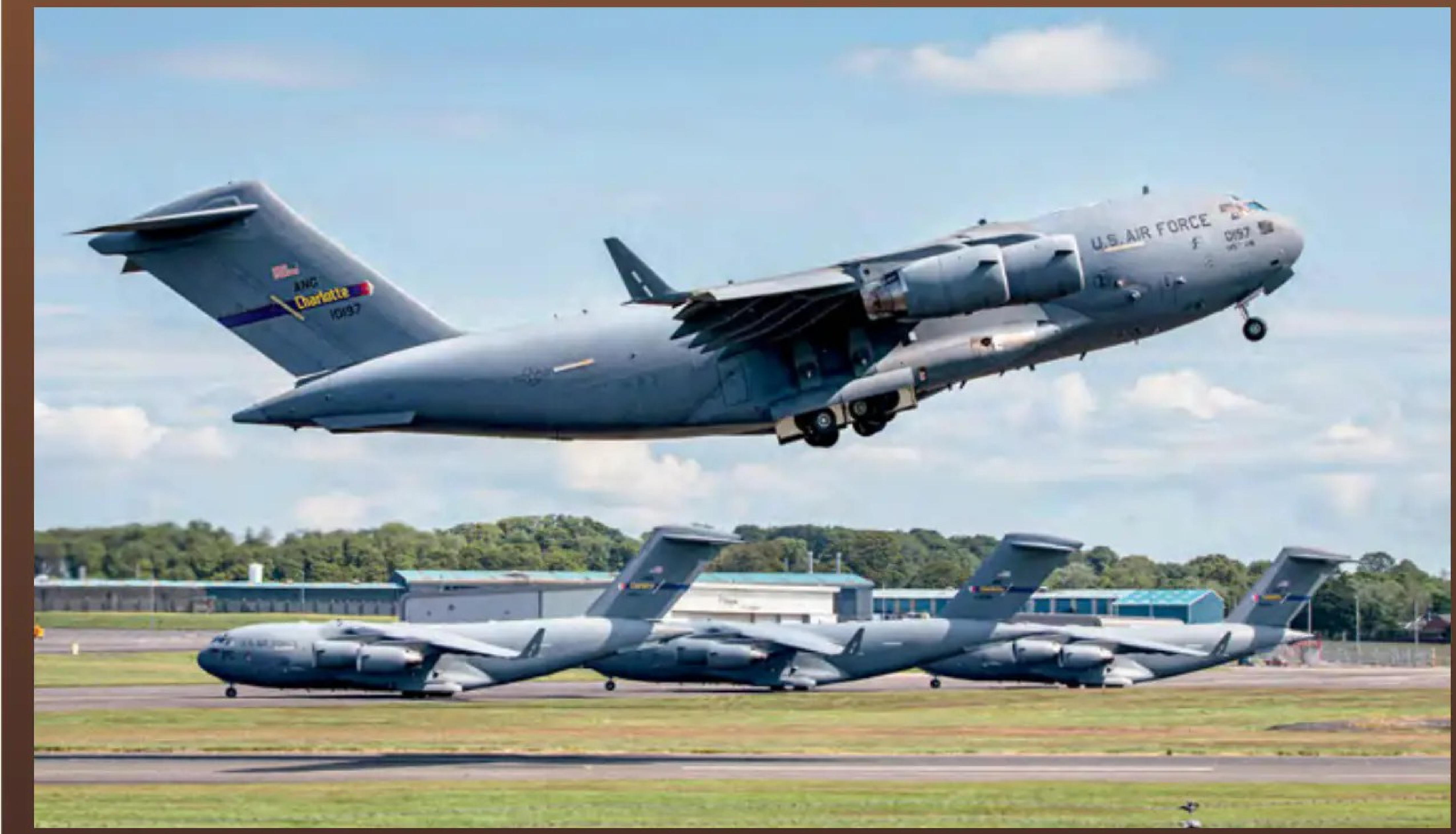
MILITARY MOVEMENTS

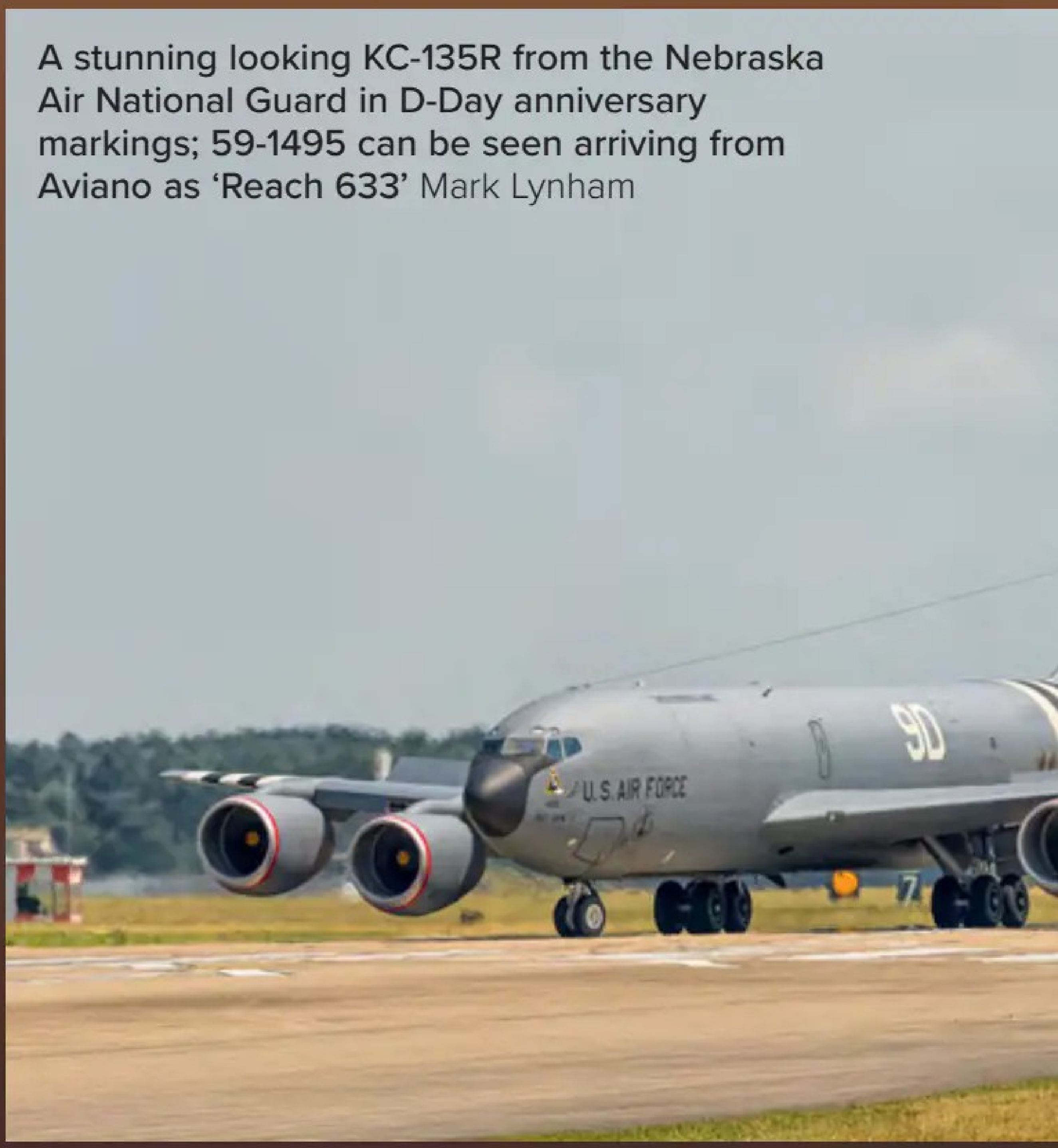
Ben Stanley Hall showcases the rich diversity of aircraft movements up and down the UK

This month's movements are dominated by US aircraft, which isn't surprising given what's happening in the Middle East. We saw multiple C-17s, including a Qatari example, feature this month. The outliers are a sunset image of one of the 12 F-22 Raptors passing through RAF Lakenheath (reportedly supporting Operation Midnight Hammer – **see page 22**) and a German CH-53GS that spent a short time in the UK.

We welcome contributions from readers across the world. If you photograph an aircraft that is not in its usual location or could be of interest, please email your images, without watermarks, to ben.hall@keypublishing.com using the subject heading 'Just Passing Through', with a short caption including as much information as possible. **Avnews**

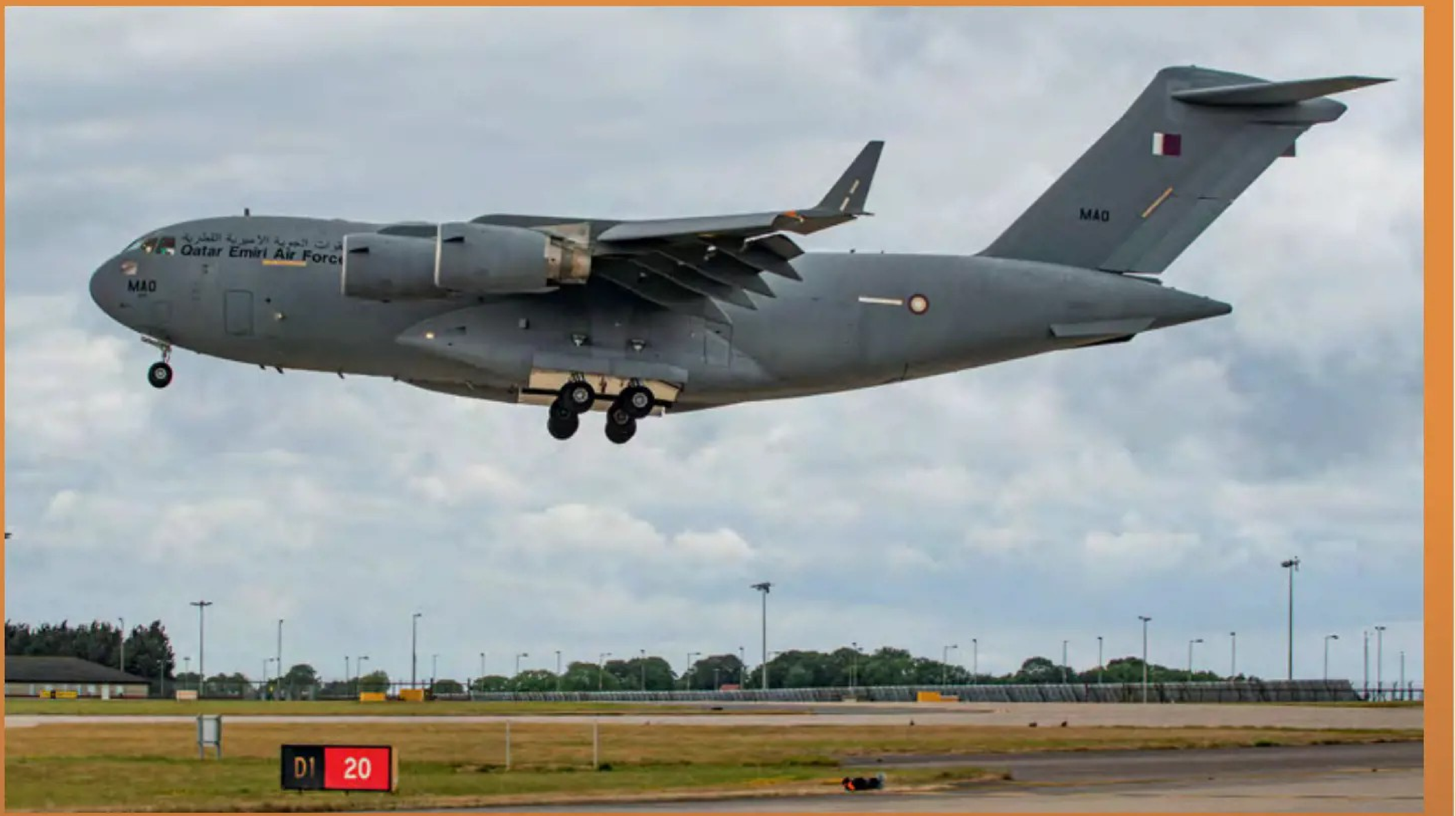


▲ A Boeing C-17A Globemaster III, USAF 156th AS/145th AW, Charlotte-Douglas, North Carolina Air National Guard, c/n 50105, seen departing Prestwick 19/06/25 as RCH830 to Paphos-LCPH. All four Charlotte C17s were fuel stopping at Prestwick before onward deployment to Paphos Nigel Patrick

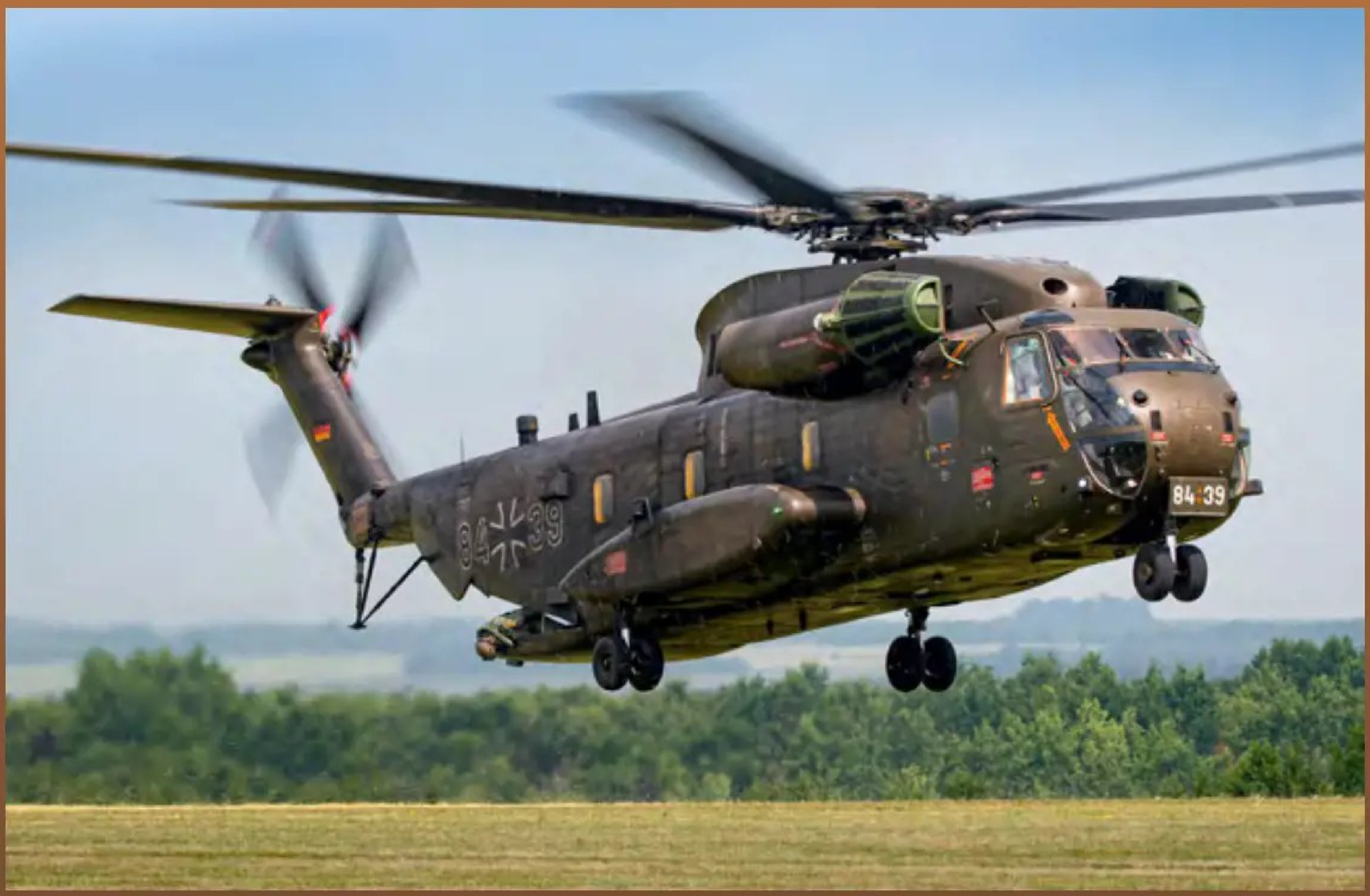


A stunning looking KC-135R from the Nebraska Air National Guard in D-Day anniversary markings; 59-1495 can be seen arriving from Aviano as 'Reach 633' Mark Lynham

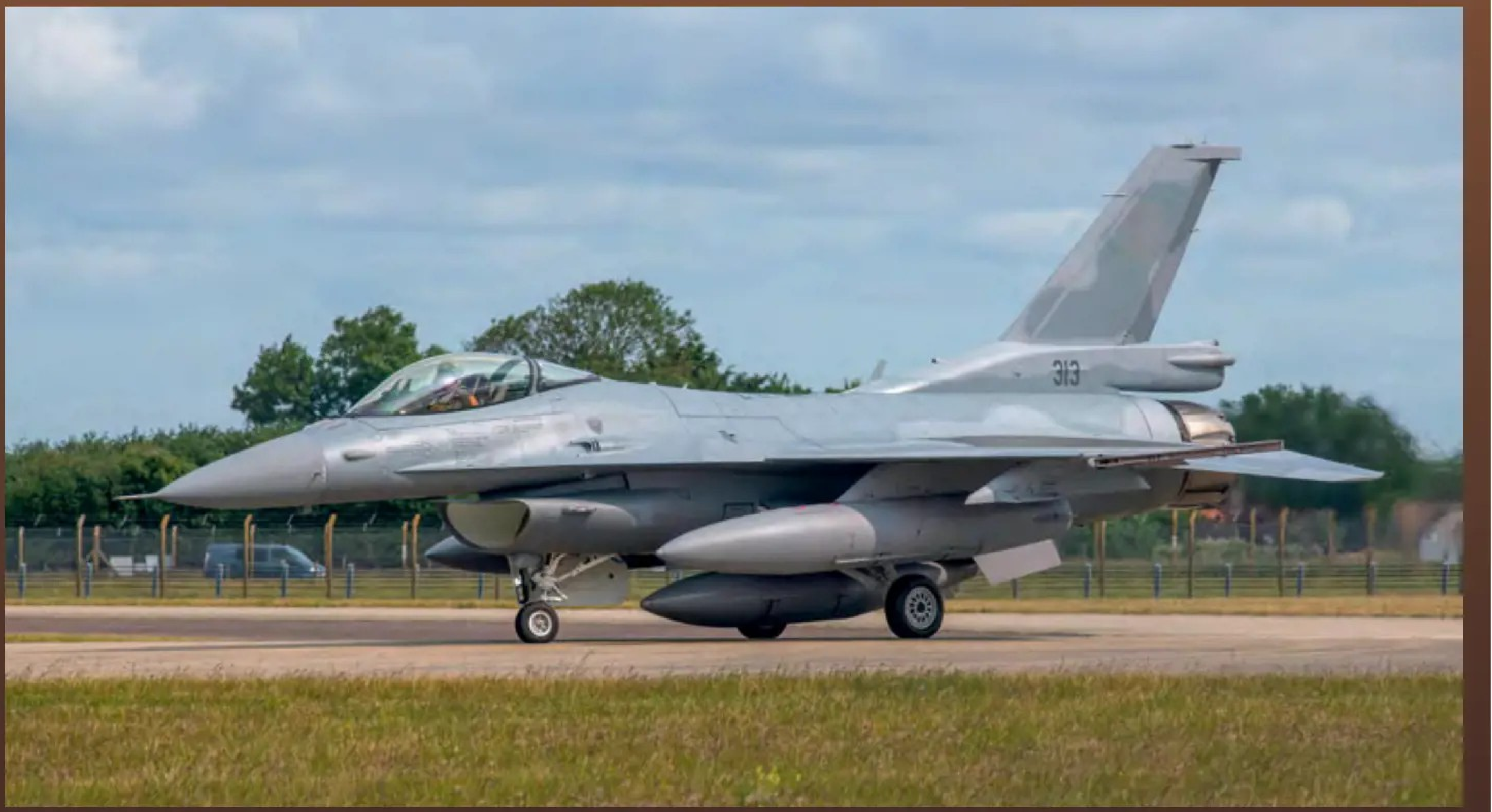
Seconds from touching down at RAF Lakenheath in a glorious summer sunset, 154 was one of 12 94th Fighter Squadron, 1st Fighter Wing F-22A Raptors from Langley AFB which passed through RAF Lakenheath on June 19. The F-22As arrived in three cells, Tabor 51-54, Tabor 61-64, and Tabor 71-74 Mark Lynham



▲ C-17 Globemaster III A7-MAO (US Number 14-0009) arrived at RAF Waddington just after midday, on June 23 using callsign LHOB 245. It came direct from Qatar and is believed to be supporting a 12 Squadron deployment to Qatar, which was expected to leave on June 24. The same day LHOB247 (C-17 A7-MAN) arrived at RAF Lossiemouth, and QAF4 (A7-HHM) – an A330-203 operated by the Qatari Amiri Flight VIP Airline also arrived at London Heathrow It's possible all three related to the deployment Mike Hiley



◀ This German Air Force Sikorsky CH-53G 84+39 briefly conducted operations within the Salisbury Plain Training Area on June 11 during a very brief visit to the UK in order to gain an invaluable insight into RAF Chinook Force operations ahead of receiving the type in the near future Chris Gilligan



▲ The first single seat Lockheed Martin F16 Fighting Falcon arrived at RAF Mildenhall on June 8 Peter R Foster

CIVILIAN MOVEMENTS

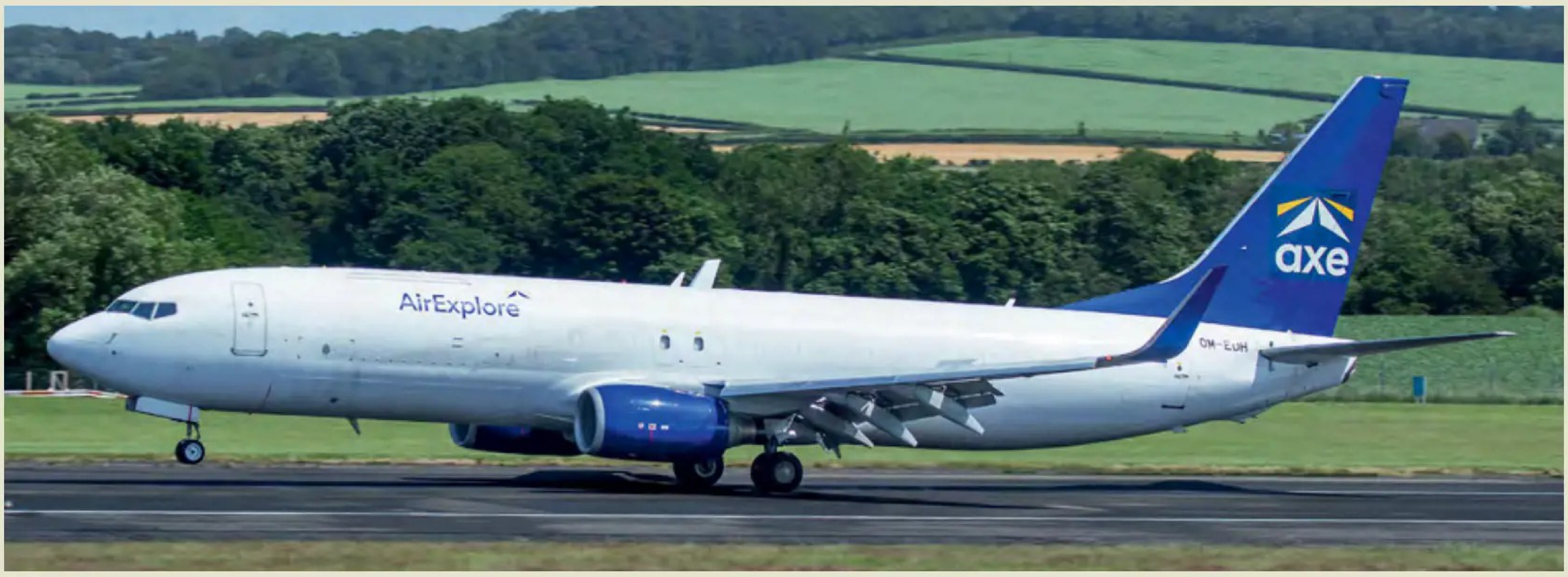
Ben Stanley Hall showcases the rich diversity of aircraft movements up and down the UK

This month's *Civilian Movements* brings a range of aircraft types, including the treasured Queen of the Skies and a lovely private 757. Thank you to our contributors for some particularly great photography.

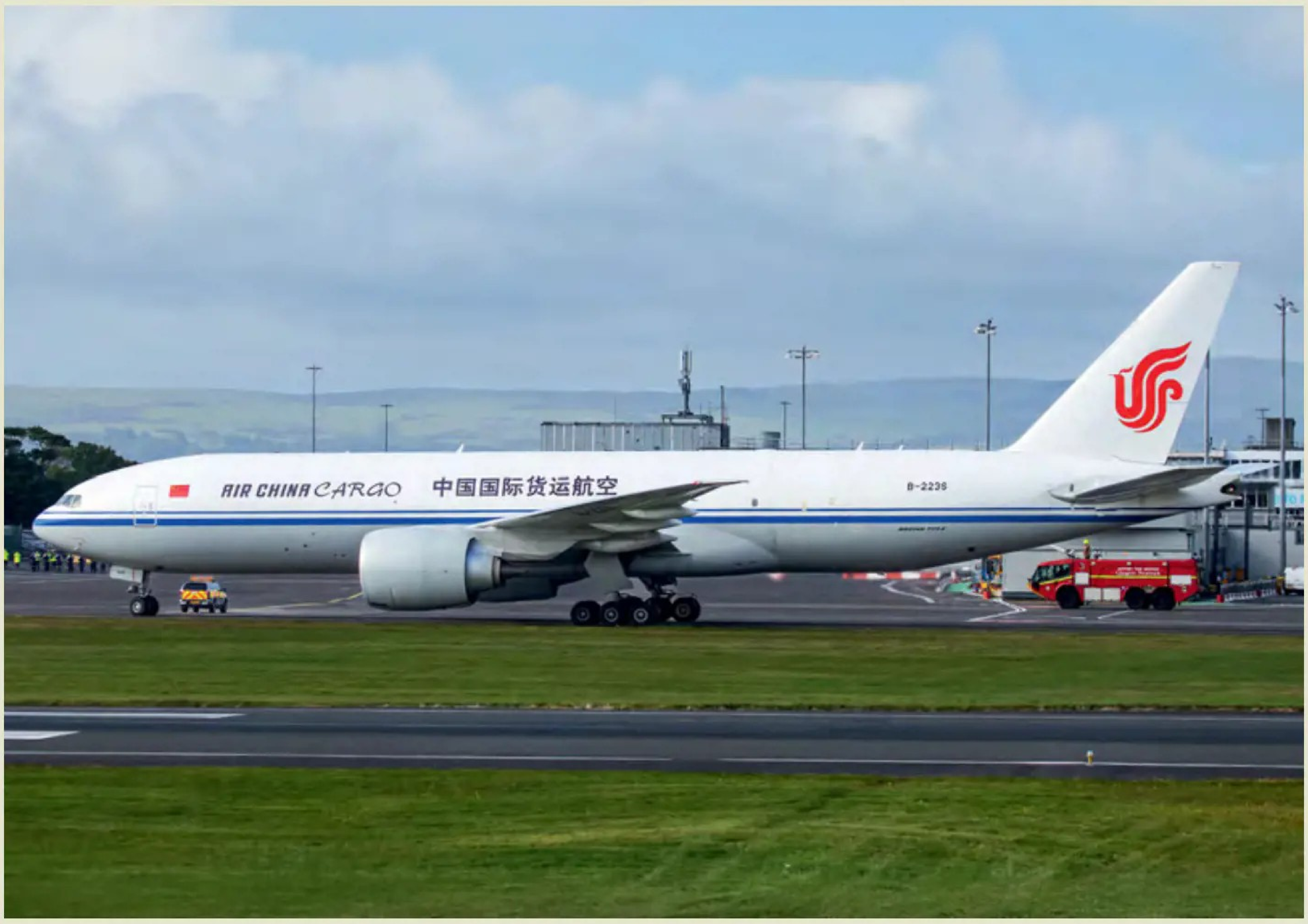
We welcome contributions from readers across the world. If you photograph an aircraft that is not in its usual location or could be of interest, please email your images, without watermarks, to ben.hall@keypublishing.com using the subject heading 'Just Passing Through', with a short caption including as much information as possible. *AN*

▲ Private 757-23N, VP-BBE, Freedom II seen at Birmingham Airport bringing the Guns N' Roses band to the UK Tim O'Grady

▲ Edelweiss Air began operating the Bristol-Zurich route on June 2, which was previously operated by Swiss Air and then Helvetic Airways. The flights operate twice a week, on a Monday and Friday Gary Morris

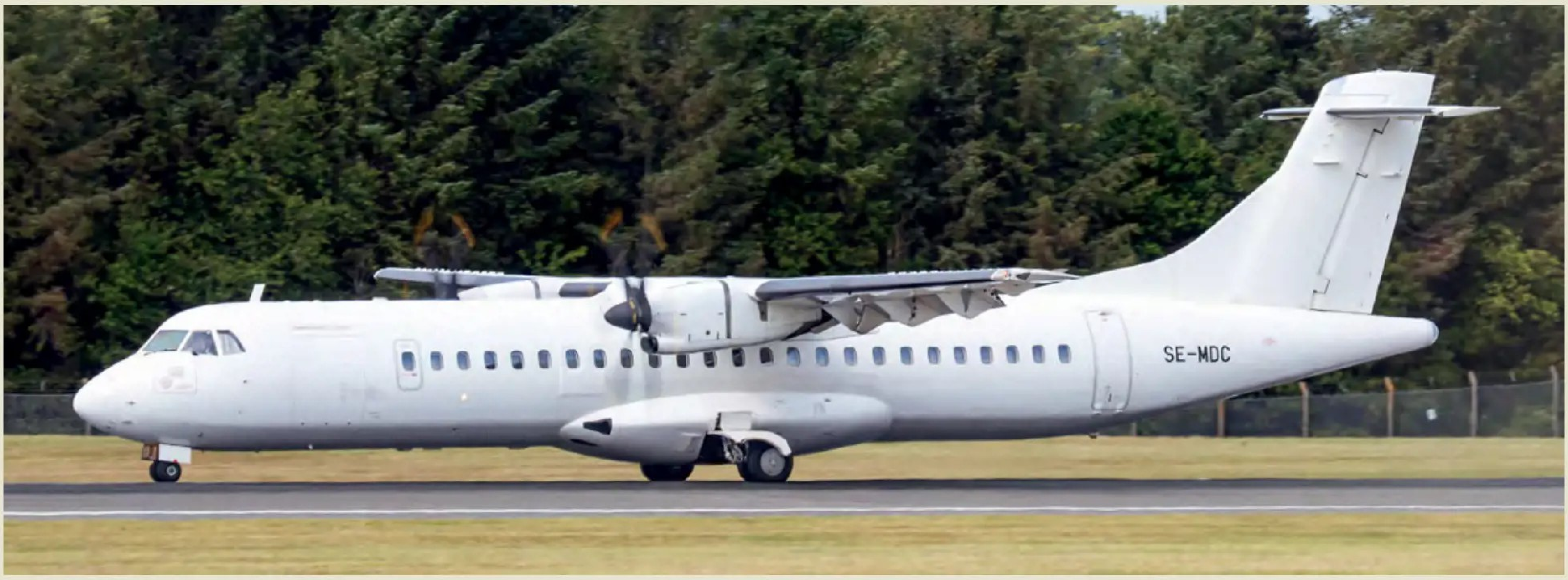


Pictured touching down at Prestwick was this former SAS Boeing 737-883 (SF), which is now operated by AirExplore. The Slovakian-registered aircraft, OM-EDH (c/n 32277), was operating a cargo charter flight from Keflavik SH



Air China Cargo has started three weekly Boeing 777 freighter flights from Peking to Prestwick Airport. B-223S (cn 67834), a Boeing 777-F, is seen on its inaugural visit to the Scottish airport on June 2 SH

On June 8, the regular Air China flight at London Heathrow was upgraded from a Boeing 777 to a 747-8. This was reportedly due to a Chinese delegation meeting US officials for trade talks in London Tim O'Grady



Pictured landing at Edinburgh is this all-white Swedish-registered ATR72-500 of Danish Air Transport. The aircraft, SE-MDC (cn 894), has been leased by Emerald Airlines, which operates on behalf of Aer Lingus SH

Next Month

Next Month

Filip Modrzejewski

Jet Zero

RAF in Poland

We join the RAF and Swedish Air force in Malbork, Poland, on NATO Air Policing duties

JetZero

The latest update on JetZero's innovation programme of creating the world's first commercial all wing design airplane.

From KC-135 to MRTT

We investigate the modernization of France's tanker fleet as it transitions from the KC-135 to the A330 MRTT.

VMM-164 Knightriders

We visit a USMC MV-22 unit after they just returned from a deployment in the horn of Africa.

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AVIATION NEWS

Augusr 2025
Volume 87 No 8
Founded in 1939 as Air Defence Cadet Corps Gazette
www.aviation-news.co.uk

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Aviation News, ISSN 2047 - 7198 (USPS 8840) is published monthly by Key Publishing Ltd, PO Box 100, Stamford, Lincolnshire, PE9 1XQ, UK.
The US annual subscription price is $72.99. Airfreight and mailing in the USA by agent named WN Shipping USA, 156-15, 146th Avenue, 2nd Floor, Jamaica, NY 11434, USA.
Periodicals postage paid at Brooklyn, NY 11256.
US Postmaster: Send address changes to Aviation News, WN Shipping USA, 156-15, 146th Avenue, 2nd Floor, Jamaica, NY 11434, USA.
Subscription records are maintained at Key Publishing Ltd, PO Box 300, Stamford, Lincolnshire, PE9 1NA, UK.
Air Business Ltd is acting as our mailing agent.

Printed by:
Acorn Web Offset Ltd, Normanton, UK
Printed in England ISSN 2047-7198

Distributed by:
Seymour Distribution Ltd, 2 Poultry Avenue, London, EC1A 9PP, UK. Tel: +44 (0)20 7429 4000

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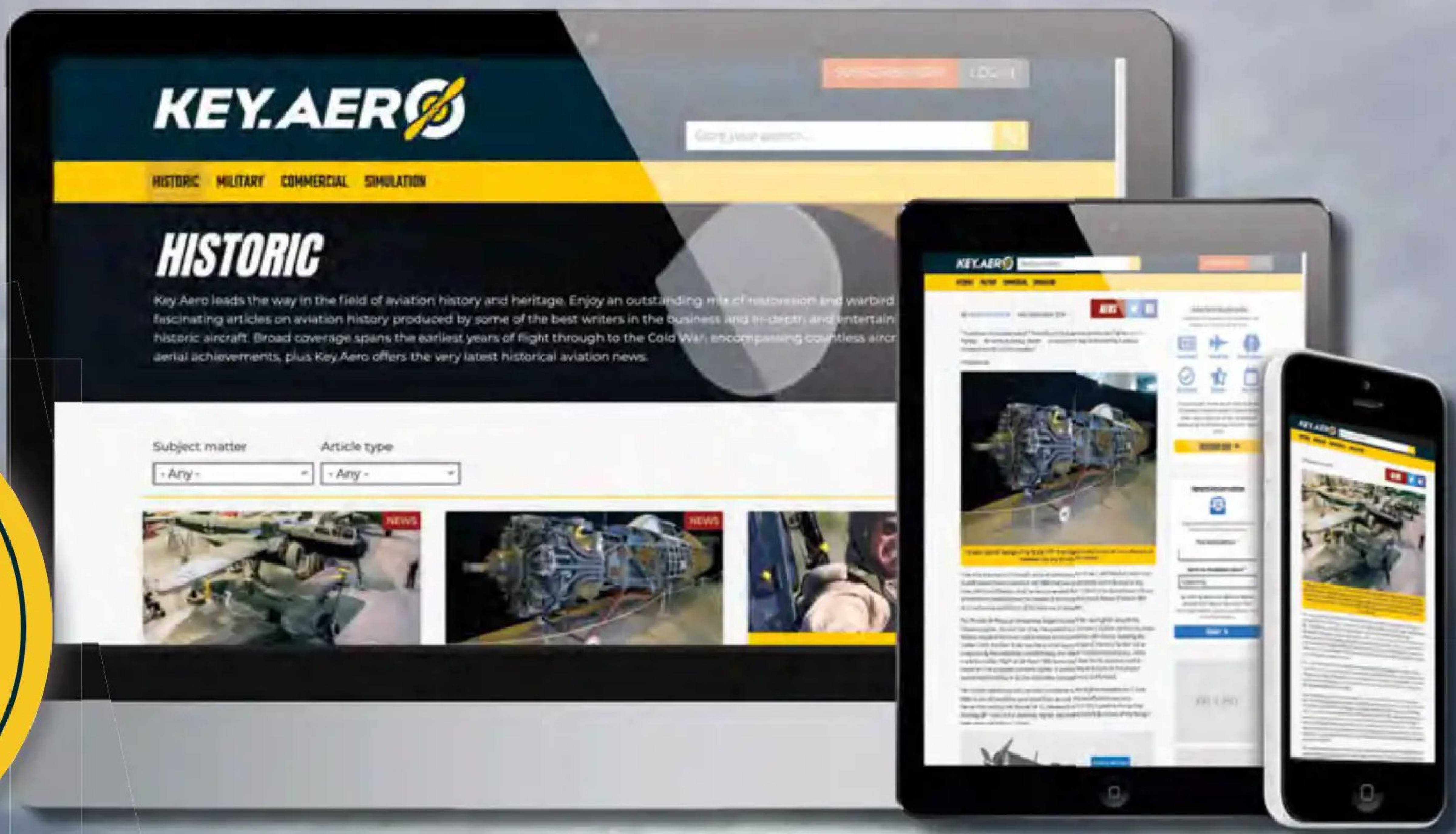
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